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JPRS Report

Nuclear Developments

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JPRS-TND-89-019

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6 OCTOBER 1989

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Paper Recounts Country's Scientific Achievements

OW1409122989 Beijing XINHUA in English
0948 GMT 13 Sep 89

[Text] China's space technology, bio-technology and nuclear science have caught up with world levels thanks to efforts of the past four decades, the PEOPLE'S DAILY reported today.

China has formed a complete and rational scientific and technological network with 9.66 million scientists. In the 1950's there were only 40,000 scientists in a few dozen institutes.

The paper reported that since China's first atom bomb was exploded in 1964, the country has developed the ability to produce atom bombs, hydrogen bombs and nuclear submarines as well as nuclear technology for peaceful use.

China has launched 25 satellites and recovered 11 of them in less than two decades, and become the third country after the United States and the Soviet Union to develop satellite recovery know-how. [passage omitted]

About 3,000 of the 10,000 major research findings and inventions China makes each year are state of the art, according to the Scientific and Technical Information Institute of China.

The paper also noted that there is a big gap between China's scientific and technological level and the goal of the modernization program.

Physicist Recalls Nuclear Weapons Development

OW1409151589 Beijing XINHUA in English
1117 GMT 14 Sep 89

[Text] Excitement aroused by the explosion of China's first atomic bomb 25 years ago has long since died down, but Professor Qian Sanqiang, who was largely responsible for the project, still gets emotional when he recalls the history of the development of China's nuclear weapons.

The 76-year-old Chinese nuclear physicist, who had served as vice-minister of nuclear industry during the crucial stage of the development of China's nuclear weapons in the 1950s and 1960s, is internationally known as China's "Oppenheimer" for his leading role in pioneering China's nuclear technology and establishing China's nuclear industry.

China started its research in nuclear science and technology in November 1949 when it established the Institute of Modern Physics under the Chinese Academy of Sciences with Professor Qian as director.

In the early 1950s, China's first nuclear institute, which was located in a small courtyard in downtown Beijing, had only a dozen researchers, including experimental

physicist Wang Ganchang and theoretical physicist Peng Huanwu. Both were chief designers of China's first atom bomb.

In the mid-1950s, the construction of China's first heavy-water nuclear reactor was completed at the Chinese Institute of Atomic Energy which Professor Qian headed.

At the instruction of the late Premier Zhou Enlai, Professor Qian helped establish the Nuclear Technology and Nuclear Engineering Departments at Beijing and Qinghua Universities respectively.

Full fledged development came only after the meeting of the late Chairman Mao Zedong with Professor Qian and other nuclear experts in January 1955. After hearing Qian's report, Mao expressed his support of establishing a nuclear industry in China. Over the following decades China's nuclear industry prospered.

In early 1964, a nuclear fuel production plant went into operation. On October 16, 1964, China successfully conducted its first atomic bomb test, and only two years and eight months later, exploded its first hydrogen bomb.

In April 1970, a model reactor for powering nuclear submarines was built and tested. Eight months later China's first nuclear-powered submarine was launched.

In September 1988, China successfully launched an experimental carrier rocket from a Chinese-built nuclear submarine.

China's nuclear industry boasts 27 research institutes, 100 enterprises and 18 universities and technical schools. The industry has a work force of 300,000, including 70,000 scientific workers.

"All this shows China's great potential in nuclear science, which has contributed to modernizing China's national defence, breaking the nuclear monopoly of the superpowers, helping prevent a nuclear war and safeguarding world peace," Qian said in an interview at his home in the western suburbs of Beijing.

In recent years, the Chinese Government has worked out a policy of "shifting the nuclear industry from military to civilian purposes."

Professor Qian said that in order to implement the new policy, Chinese nuclear scientists should stress research on nuclear power stations and the application of isotopes and radiation in industry, agriculture, medicine, archeology, and scientific research.

According to a Chinese Government official, China has developed more than 1,000 nuclear products for civil use, accounting for 33.7 percent of the total industrial output value of the nuclear industry in 1988.

Famous Scientist Reviews Nuclear Development*OW1509181489 Beijing Domestic Service in Mandarin
0930 GMT 15 Sep 89*

[From the "National Hookup" program]

[Text] To mark the 40th anniversary of the founding of New China, the China Association for Science and Technology and the Beijing Association for Science and Technology held a meeting today and asked famous scientist Qian Sanqiang to describe how China relied on its own efforts in developing its nuclear technology.

Qian Sanqiang said: During the past 40 years since the founding of New China, we have succeeded in developing the nuclear bomb, the hydrogen bomb, a nuclear submarine, and in launching a carrier rocket from a Chinese nuclear submarine. All this has shown that China has already broken the superpowers' nuclear monopoly and formed its own nuclear force. He said: We attribute all our achievements in this connection to the correct policy decision made by the party Central Committee, Chairman Mao and Premier Zhou and the path of self-reliance and hard struggle which we followed.

Recalling his work at the Academy of Sciences and the various organizations under its administration in the early stage of liberation, Qian Sanqiang said: At that time, all neglected tasks were to be undertaken and we were faced with many difficulties. The Western countries were imposing an embargo on us. However, we in China's nuclear industry were not awed by the difficulties. We used our experiences in Yanan's liberated areas of achieving our goal of having ample food and clothing with the spirit of self-reliance to guide our work in the field of scientific research. We trained a group of backbone cadres in the field of nuclear technology and laid a solid foundation for the development of nuclear science and technology.

Qian Sanqiang said: After the withdrawal of foreign experts in 1960, we worked even harder than ever before. On October 16, 1964, China successfully conducted its first atomic bomb test and only two years and eight months later, exploded a hydrogen bomb. China had become the nation with the shortest interval between the successful explosion of atomic and hydrogen bombs.

In conclusion, Qian Sanqiang said: Only by following the leadership of the Communist Party of China; taking the socialist path of independence and self-reliance; relying

on the broad masses of intellectuals, workers, and cadres; and achieving a nationwide mass cooperation, will it be possible to help China's nuclear energy industry grow out of nothing and remain invincible. China's valuable experience in the development of nuclear science and technology is still of immediate significance.

Energy Vice Minister Hu Attends IAEA Meeting*OW2609083889 Beijing XINHUA in English
0357 GMT 26 Sep 89*

[Text] Vienna, September 25 (XINHUA)—The International Atomic Energy Agency opened its 33rd annual general conference in the U.N. city here today.

Delegates from 98 countries among the 113 member states of the Energy Agency attended the meeting. Doctor Kunmo Chung from South Korea was elected chairman of this conference. The five-day meeting will approve the agency's 1988 annual report, the 1988 final accounts and the 1989 budget, with nuclear safety and international cooperation in radiation protection as the focal point. [passage omitted]

Chinese delegation leader and vice minister of energy, Hu Fuguo, at the conference briefed the development of Chinese nuclear power and reiterated China's consistent policy of "quality first, and safety first" in this regard.

Guangdong Nuclear Power Plant Adds Dome With International Help*OW2109211089 Beijing XINHUA in English
1608 GMT 21 Sep 89*

[Text] Shenzhen, September 21 (XINHUA)—A huge steel dome weighing 160 tons was lifted 45 meters and installed atop the No.1 reactor today at the Guangdong Nuclear Power Plant.

The doming work reflects the international character of the construction of the plant. The manufacture and lifting of the dome were jointly carried out by the French C.B. Company and China Huaxing Construction Company, while the French Framatome-Spie Batignolles Company and the No.23 Branch of the China Nuclear Industry Company are responsible for the welding and erection of the pipelines and supports in the lower part of the dome.

Guangdong Province's thermal power plants have a total generating capacity of 2.9 million kw., while the single nuclear power plant in the province will have a generating capacity of 1.8 million kw.

JAPAN

Atomic Bomb Materials Offered to U.S. Embassy

5 Arrested for Trying To Sell Uranium

OW0509013589 Tokyo KYODO in English
0057 GMT 5 Sep 89

[Text] Police said Tuesday they have arrested five Japanese for trying to sell uranium to the U.S. Embassy in Tokyo as atomic bomb materials.

Four men and a woman have been arrested in the case, the police said.

On examination by an atomic research center, a sample brought by members of the group to the embassy proved to be natural uranium, police said.

Police said somebody telephoned the embassy in early August and offered to sell uranium at a price of 12 billion yen.

The group continued contacts with the embassy on the deal and one of the five gave a name card to an embassy official.

The embassy and police took pictures and videotaped members of the group when they came to the embassy to negotiate the deal.

Police said they suspect the five are sales agents and there is an organization behind them.

Strict controls are imposed on the use and transportation of uranium, which is used to make nuclear power plant fuel and material for nuclear weapons.

More on Attempted Uranium Sale

OW0509044889 Tokyo KYODO in English
0410 GMT 5 Sep 89

[Text] Police said they have arrested five Japanese on charges of trying to sell four kilograms of uranium to the U.S. Embassy in Tokyo for 12 billion yen.

Police said the group brought a sample to the embassy, which proved to be 70.7 percent pure natural uranium refined from uranium ore. Police said they suspect there is an organization behind the five suspects and the uranium was imported.

The suspects are Koichi Tsuru, 33, a securities firm president, of Hong Kong; Toshitada Mizuno, 44, a real estate company president; Kazutoshi Okazaki, 44, a self-styled tea ceremony master; Tomoyuki Nishida, 39, an import-export trader; and Toshiko Nishijima, 43, unemployed, all of Tokyo. They were charged with violating a law regulating nuclear materials.

Police are hunting for several other men in the case.

The U.S. Embassy had no comment on the case, saying it is a police matter. Police said a member of the group

telephoned the embassy on July 28, saying it had four kilograms of uranium to sell for 12 billion yen. After several contacts, the group brought a bottle containing about 100 grams of uranium as a sample to the embassy August 8, police said.

The group told an embassy official that they bought the uranium from a man about one and a half years ago for 5.12 billion yen, police said.

The group said the man is keeping the uranium for them, charging 3 million yen a day for storage, police said.

The embassy asked Tokyo police to investigate the case August 7.

Police and embassy officials photographed and videotaped group members who came to the embassy to negotiate the deal before police arrested them last Friday.

Strict controls are imposed on the use and transportation of uranium which is used to make nuclear power plant fuel and nuclear weapons.

SOUTH KOREA

U.S. 'Concerned' Over DPRK's Nuclear Capability

SK1509023089 Seoul YONHAP in English
0137 GMT 15 Sep 89

[Text] Washington, Sept. 14 (YONHAP)—Both the United States and the Soviet Union are gravely concerned that North Korea could develop a nuclear capability, a U.S. State Department official said Thursday.

The United States keeps a close watch on North Korea because of its refusal to sign a nuclear safety accord that would enable international bodies to make on-the-spot inspections of its nuclear facilities even though more than three years have passed since North Korea signed the nuclear non-proliferation treaty, said Spencer Richardson, the State Department's Korea section chief.

Moscow would also take it seriously if North Korea had the capability to develop nuclear weapons, Richardson told South Korean reporters here.

According to news reports, Washington has notified Moscow of North Korea's efforts to develop nuclear weapons and the superpowers have consulted about it.

Diplomatic sources said U.S. Secretary of State James Baker and Soviet Foreign Minister Eduard Shevardnadze are expected to discuss the matter when they meet in Wyoming on Sept. 22.

Richardson said there has been no contact between U.S. and North Korean officials in Beijing since their fourth contact May 15, but added the channel in Beijing is still open.

He said the chance for a change in U.S. policy toward Pyongyang is dim in the near future, reminding reporters that Washington still lists North Korea as a terrorist state along with Cuba and Libya.

Popular Poll Shows More Nuclear Plants Favored

SK0809023289 Seoul YONHAP in English
0211 GMT 8 Sep 89

[Text] Seoul, Sept. 8 (YONHAP)—A majority of South Koreans view nuclear power plants positively and are rather supportive of additional construction of them in their nation to meet the growing energy needs, a polling organization said Friday.

Most Koreans see nuclear power as "powerful, progressive and clean," according to the Korea Gallup Polls Institute, which surveyed 2,300 people from Korea's six biggest cities—Seoul, Pusan, Taegu, Kwangju, Incheon and Taejon—and from four nuclear power plant sites—Kori, Wolsung, Yongkwang and Ulchin—at the request of the Korea Atomic Industrial Forum.

Fifty-seven percent said atomic power is more economical than thermal power while 25.9 percent said the opposite, Gallup said.

While 58.1 percent said additional atomic power plants are needed, 34.4 percent disagreed.

In a similar survey in Japan in November last year, 59.9 percent said they supported building additional plants while 30.4 percent were against it. The figures in the United States were 57 percent for and 31 percent against in May 1986 but 77 percent for and 19 percent against in May this year.

Gallup said Koreans attach most importance to safety.

Safety was cited as the most important consideration in the construction and operation of nuclear power plants by 50.8 percent, followed by environmental concerns with 22 percent, economy with 11.3 percent and technological self-reliance with 10.5 percent.

Only 26.1 percent thought atomic plants in Korea are safe while 72.5 percent said they are unsafe.

Nuclear waste is disposed of improperly, according to 63.9 percent. Gallup said this reflects the impact of a recent scandal over the burial of Radioactive waste in Kori.

An overwhelming 92.8 percent of the respondents living near plant sites said no damage at all is done by them, while 6.8 percent reported fishing ground destruction, marine pollution and agricultural spoilage.

Criticism of nuclear power was stronger near plant sites than in large cities, Gallup said.

It said few Koreans are interested in the matter and they have little access to information, suggesting that the government and plant operators need to inform the public.

BULGARIA

Israel's Development of Missile Viewed

AU2009122889 Sofia NARODNA ARMIYA in
Bulgarian 15 Sep 89 p 3

[Ivan Peev Article: "Attention: Medium-Range Missiles...!"]

[Text] The USSR-U.S. INF Treaty has been successfully implemented for more than 12 calendar months, and the Geneva talks on reducing the USSR and U.S. strategic "triads" have been resumed. However, certain alarming phenomena remained behind the euphoria which accompanied the signing and the beginning of the implementation of this historic document, which was the result of human wisdom and the new political thinking. After years, precisely those phenomena could block the favorable tendencies in the sphere of nuclear disarmament.

There have been frequent reports by various sources on the proliferation of missiles and strategic weapons. A medium-range ballistic missile, completely produced in the Republic of South Africa [RSA] and capable of delivering a nuclear warhead, was successfully launched on 11 July at the Owenberg testing grounds, near Capetown. An official announcement published in Pretoria described the test as a "great step forward," and did not mention that the missile in question is a modification of the Israeli "Jericho-2" missile.

This fact leads us to another "partner in the deal"—Tel Aviv. Last autumn, after Israel successfully launched two earth satellites—"Ofek-1" and "Ofek-2," it became clear that a new factor of insecurity has been introduced to the Middle Eastern military-political gambit. This is so because the "Jericho-2" missile can deliver a nuclear warhead to the distance of 1,440 km. This means that all "frontline countries" of the RSA and Israel are within reach of this missile. The dangerous development of events does not stop here. According to data published by the U.S. CIA in July 1989, the launching of a new "Shavit" missile with a range of 3,200 miles is in a preliminary phase. William Webster, CIA director, recently said that the proliferation of missile production technologies represents "new threats for regional stability and U.S. interests.... We also are concerned by the overt sale of missile systems by certain countries."

Observers correctly assessed those words as a thinly disguised reproach, directed at Tel Aviv, Pretoria, and certain FRG companies, which have sold missile components to the RSA, Argentina, and certain Arab countries. (The missile strikes exchanged between Iran and Iraq during their war are a proof of this.)

This problem of cooperation between racists and Zionists has a long history. In 1987 Tel Aviv and Pretoria signed an agreement on the joint development and testing of various kinds of missiles. Because of its small territory Israel is using testing grounds in the RSA. Until now only "Jericho-1" (with a range of 800 km) has been

fired from Israeli territory in the direction of the Mediterranean. According to the British paper THE GUARDIAN, "If intelligence data indicating that the range of the 'Comet' [shavit is comet in Hebrew] will be 3,200 miles, and after likely technical improvements—up to 4,000 miles—then in principle, Leningrad and Moscow will be within the range of its possibilities."

Against the background of this development it is only logical that Israel's Arab neighbors would not stay idle. U.S. experts have already classified "Shavit" as an "international ballistic missile."

On 10 February it was announced in Islamabad that Pakistan had conducted a successful test with a ballistic missile, designed and produced in Pakistan. Speaking to foreign correspondents Mirza Aslam Beg, commander in chief of the General Staff, stated that the country's industry is already capable of producing "an extraordinarily accurate missile, which can deliver a 500 kg warhead, which can strike targets within a range of 300 km." According to the general, new developments in this area are imminent.

While the CIA's concern about the migration of missile weapons and systems is indeed understandable, a correction is necessary, because Webster's reproach needs to be explained. No other country embraced the idea of participating in developing separate components of former President Reagan's "Star Wars" program with such enthusiasm as Israel. In 1988 alone the contracts surpassed \$165 million, three-quarters of which will be utilized for the development in Israel of a new system for intercepting "Arrow" medium-range missiles. In March 1989 the organization in charge of implementing the Strategic Defense Initiative signed a contract with Tel Aviv on creating a computer center for simulating a new system of anti-missile defense under conditions of the Middle Eastern potential combat field. As far as the satellites of the "Ofek" type are concerned, they serve military intelligence purposes, and will direct the Israeli "Khets" and "Barak-1" missiles toward strategic targets in the entire Arab world.

A commentary in the Soviet daily KRASNAYA ZVEZDA pointed out: "Certain Arab countries, led by Egypt, are already advancing toward developing joint measures related to opposing this superiority in space. The financing of the Egyptian project on launching an Arab satellite will be undertaken by Kuwait and Saudi Arabia." Pakistan and Turkey expressed readiness to maintain the "strategic balance" in the region. For this purpose Turkey will supply the Arab countries with 40 F-16 aircraft produced by it.

So long as the potential hotbeds of tension exist (the Middle East knot, and tension in relations between India and Pakistan and between the RSA and the "frontline countries"), it is not very likely that the missile arms race in those neuralgic zones will be tamed. Like the affair with the FRG companies, about whose deals the FRG Government knew nothing (?), the commercial interests

of the concerns that compete in the realm of advanced technologies are, in principle, placed above the interests of regional and global security. There also are ambitious leaders in many countries who adhere to the thesis that they must at all costs be "one step ahead of the potential enemy." Against the background of the existing lack of confidence vis-a-vis one's neighbor (to put it mildly), such logic is dangerous. The migration of missiles and nuclear weapons would not be possible without the tolerant attitude of the leading states, because a country like Pakistan, for example, has extremely limited technical and financial resources, which prevent it from implementing such ambitious plans alone.

The circle is being closed in a dangerous fashion. One day the best achievements in the area of disarmament, the first tender shoots of which were greeted by the world's peace-loving public, could be jeopardized.

CZECHOSLOVAKIA

New Nuclear Plant Design Developed

AU1909134889 Prague RUDE PRAVO
in Czech 16 Sep 89 p 2

["pp"-signed report: "New Design of a Power Plant Unit"]

[Text] Prague (from our correspondent)—Under the law on the range of activities of central agencies, passed late last year, the Czechoslovak Atomic Energy Commission (CSKAE) became a federal body of state administration subordinated directly to the CSSR Government. The commission's status has thus been significantly raised. Apart from tasks in the development of nuclear technology and the use of nuclear materials for peaceful purposes, the commission safeguards CSSR commitments concerning nuclear safety and the Nuclear Nonproliferation Treaty.

An integral part of the CSKAE's activity is international cooperation, particularly with socialist states. Its attention is concentrated primarily on the fulfillment of tasks within the Comprehensive Program for the CEMA Countries' Scientific and Technical Development Through the Year 2000 and, more specifically, on its third priority direction—the accelerated development of nuclear power engineering. In view of the fact that the present model of the nuclear power station being built at Temelin trails behind the world level, especially from the economic viewpoint, the development of a nuclear power generating unit of a new generation was included in the comprehensive program last year, on Czechoslovakia's initiative. The unit's technical specifications are being worked on at present. Addressing a news conference in Prague on Friday [15 September], CSKAE Chairman Stanislav Havel also spoke about cooperation with the Vienna-based International Atomic Energy Agency and its member countries. He said, for example, that an agreement is being prepared with the FRG on the regulation of questions of common interest involving nuclear safety. A similar agreement with Austria was concluded several years ago.

POLAND

Appeal for Nuclear Program Preservation

AU0609102789 Warsaw TRYBUNA LUDU in Polish
2-3 Sep 89 p 3

[Michal Misiorny report: "Nuclear Energy Program on the Scrap Heap?"]

[Excerpts] The building materials arrived on the construction site on the last day of March. The builders decided not to start work on the superstitious date of 1 April, and the symbolic "first spadeful" was dug the following day—2 April 1982. Work had begun on the nuclear-powered electric power station in Zarnowiec. The official flowcharts predicted the plant would come on stream in 1990, with the remaining work to be completed in 1994.

The decision to commence the costly but necessary project was taken at a very difficult time. The economy was sliding into crisis. Politically, it was not the best of times either. Martial law had been imposed 4 months earlier. In comparison with the present day, the climate of public opinion, however, seemed to be better, and although accidents in nuclear power stations were known to occur—for example, Harrisburg—the tragic legacy of Chernobyl was as yet unknown. The nuclear option was not in doubt in the Polish energy program. (passage omitted)

The Zarnowiec power station was to be a giant (four generators with a total output of 1,860 megawatts) that would make a distinct contribution to Poland's energy requirements. It would be modern and as safe as possible. It was not foreseen that right from the start the project would be dogged by the chronic shortfalls of our economy—the production stoppages and supply delays. The planners envisaged that the first supplies of electricity would flow in 1990, the remaining work to be finished in 1994. We now know these dates to be unrealistic (especially the first one). More could have been done than was in fact done. Figures show that about 40 percent of the project has now been completed. According to 1984 prices, the power station was to cost Z155.6 billion. In 1986 these estimates were revised to Z550 billion. Today we know that these costings were produced by bureaucrats, and they were unrelated to the real rise in inflation, although the total expenditure to date has not exceeded the 1984 figure.

The Zarnowiec power station has now risen well above ground. The observer is greeted by an imposing industrial complex surrounded by various other buildings. I was there this August soon after the much publicized decision of the Bank of Gdansk to withdraw its finance. I was greeted by ominous silence. [passage omitted]

Poland is to be a nuclear-free country, says current public opinion, and this sentiment fits in well with the present financial constraints of the state's investment programs. Public opinion, chilled to the marrow by the shock of Chernobyl and then inflamed by the subsequent

mass media and protest campaigns, has now relaxed. The devil take the Z220 billion already spent. A second projected electricity power station in Klempicz has already been shelved, and Zarnowiec, almost half complete, is now waiting to hear its fate. [passage omitted]

Today our nuclear power lobby is very weak. It also shoulders the undeserved and tragic burden of Chernobyl. It has been unable to convince public opinion that Zarnowiec is based on a different reactor which is acknowledged to be safe throughout the world. When emotions run high, it is difficult to persuade public opinion that nuclear power energy is environmentally safer than energy produced by conventional thermal means. We have not been able to overcome the stigma of the dependence on our nuclear program on supplies of fission fuel from abroad. The most important question, the prognosis for our future energy requirements, is not being discussed, and is totally forgotten. There are certain myths that say it is enough to restructure our economy and we will have sufficient energy supplies for many years to come.

The truth is different. Economic restructuring is dependent on energy. Poland is one of those countries that have a relatively low electricity consumption per capita and per worker (it consumes about half of what Belgium, Holland, France, and the FRG consume respectively).

moreover, its energy is obtained from the traditional coal-burning power stations that pose an extreme hazard (even from the point of radioactivity) to public health and the environment. Belgium gets 60 percent of its energy from nuclear power; France 70 percent; Finland, Switzerland, and Sweden 40 percent; and the FRG 30 percent. What is saddest of all is that we only need two hard winters to realize just how inefficient and tired our underfunded energy sector is. We will have to use candles. It is better not to dream about the day when our industry begins to function at full power. [passage omitted]

Despite all reasonable arguments, the pressure of public opinion insists on keeping Poland isolated as if it were some desert island. We shall soon be facing shortfalls in electricity production, and many experts are beginning to voice their concern. Their voice is too weak, however, and the credibility of the state (the investor) is low. Is Zarnowiec, like Klempicz, to be sacrificed on the altar of antinuclear emotion? [passage omitted]

At present, our energy industry does not have any alternative to nuclear energy, and that is the reason why, despite the strong psychological barrier, we must go for this option. If tomorrow, other and better possibilities appear, then we will all be delighted. Tomorrow, however, is a long way away.

ARGENTINA

U.S. Base, Nuclear Dump Installation Denied

PY0809222289 Buenos Aires DYN in Spanish
1814 GMT 8 Sep 89

[Text] Foreign Minister Domingo Cavallo denied today that a proposal has been received for the installation of a U.S. military base in the country and that the government is analyzing the proposed installation of a nuclear waste "dump," which, he added, would be "very dangerous."

Cavallo made this declaration at the end of a ceremony in which the new Argentine ambassadors and foreign service officials were sworn in.

The ceremony was held in the Golden Hall of the San Martin Palace. Amalia Lacroze Fortabat, Juan Jose Zanola, Abelardo Ramos, Julian William Kent, Julian Licastro, Alberto Brito Lima, and the president's brother Munir Menem, among other, took the oath of office.

The foreign minister says that when President Carlos Menem meets with his U.S. counterpart, George Bush, late this month he will thank him for the U.S. good offices in bringing about a rapprochement with the United Kingdom, and said that henceforth "negotiations between Argentina and Great Britain will be conducted bilaterally."

He then denied that talks with U.S. Government officials have included the possibility of installing a U.S. military base in Patagonia. He dismissed reports that the government is considering installing a nuclear waste dump in that region. Cavallo added that, in his view, the construction of a "nuclear dump" would be "very dangerous" for the Patagonian ecological system.

During President Menem's recent trip to Yugoslavia to participate in the nonaligned countries assembly, he offered to mediate in the Middle East conflict. Minister Cavallo noted that "the opinion of the parties involved" must be heard before "moving ahead" with that initiative.

Feasibility Study Done on Nuclear Waste Dump

PY1209040889 Buenos Aires Domestic Service in Spanish 0200 GMT 12 Sep 89

[Text] Manuel Mondino, chairman of the National Commission for Atomic Energy (CENA), has disclosed that a feasibility study is under way for the construction of a nuclear waste dump near Gastre in Chubut Province, but added that it will only be used to store Argentine nuclear waste.

Moreover, he noted that for the time being the possibility is only being studied and will have to be approved by the national authorities. Mondino added that the CENA is only anticipating the needs that will come with the use of Argentine nuclear fuel.

Further on Embalse Nuclear Plant Operations

PY0409235989 Buenos Aires NOTICIAS
ARGENTINAS in Spanish 1955 GMT 4 Sep 89

[Text] Buenos Aires, 4 Sep (NA)—The Embalse Nuclear Plant in Cordoba today began to integrate all its electrical energy to the national power system. The Luis Piedrabuena Thermoelectric Plant of Bahia Blanca is not yet operating and its date for resuming operations is still unknown.

The Embalse Nuclear Plant resumed operations last weekend after a technical checkup that began 29 July.

The Piedrabuena plant operated at full strength for only 30 minutes last week when a new technical problem put that plant out of service.

The various origins of the components to Machine 1 of the Piedrabuena plant have made repairs very difficult. The deadline for resuming operations at this plant will therefore not be fulfilled.

The original deadline for resuming operations at this plant was 10 September, but due to new technical problems it will take more time for the plant to produce electricity for the national power system.

BRAZIL

Deal With U.S. Space Firm Protested

PY1609153889 Rio de Janeiro O GLOBO in Portuguese
15 Sep 89 p 18

[Text] Sao Jose dos Campos, Sao Paulo State—Scientists linked to the Brazilian space program, which is now delayed for the lack of funds, have expressed disapproval of an announced joint venture with the U.S. Space Commerce Corporation, a U.S. company, for the purpose of launching satellites with Soviet rockets in Brazil. In the scientists' opinion, Brazil's Satellite Launching Vehicle, VLS, program should be supported, now that it is in the final stages of development. The Space Research Institute (INPE) has confirmed that members of the Space Commerce Corporation and the Soviet space agency today will visit the institute's installations, as well as those of the Aerospace Technical Center.

During his visit to INPE last week, Arthur Dula, president of the Space Commerce Corporation, admitted that he was late in coming to Brazil, because his corporation—which is a service representative of the Soviet aerospace industry in the West—had missed its chance when it failed to participate in the bidding for launching the Brasilsat satellite.

For 2 hours, Dula toured the INPE laboratories, watched films, talked with a group of researchers, and met separately with two directors of the institute. During that time Dula did not reveal any Soviet interest in establishing a satellite and rocket manufacturing plant in Brazil. In the opinion of Brazilian scientists who are engaged in joint

research with Soviet institutions, there is not the slightest chance that such an undertaking can succeed, because the Soviets maintain rigid norms for the production of such devices and for controlling their technology. The Soviets want to sell ready-made satellites and rockets but have never demonstrated interest in manufacturing them outside their country.

The name of the Brazilian company that would associate with the Space Commerce Corporation was not confirmed. Avibras [Brazilian Aerospace Industry], a rockets and weapons manufacturer, is a likely partner, but it has denied that it would.

Soviets Propose Joint Satellite Development Plan

PY1609150089 Rio de Janeiro. O GLOBO in Portuguese 15 Sep 89 p 18

[Text] Brasilia—The space center that the Aeronautics Ministry is building in Alcantara, Maranhao State, might be used for launching rockets and satellites developed jointly by Brazil and the Soviet Union. This is one of the proposals being discussed by the two countries under the space agreement signed last year during President Jose Sarney's visit to Moscow. The Soviets' interest in the Alcantara Space Center was confirmed by Boris Khabirov, Foreign Ministry representative and member of the mission from Glavkosmos—the Soviet space agency—that is visiting Brazil.

The Soviet mission yesterday held its first meeting with Brazilian Government officials and was received by Admiral Valbert Lisieux Medeiros de Figueiredo, chief of the Armed Forces Joint Staff (EMFA) and president of the Brazilian Space Activities Commission (COBAE).

The Alcantara Space Center, which is scheduled for completion in December 1991, has one of the best locations in the world for saving fuel during satellite launches.

At the first meeting, the Soviets presented several proposals for the joint development of meteorological, remote sensing, and communication satellites. Adm Valbert Lisieux said that technology transfer is an essential consideration, and that the Soviets agree to transfer technology only for peaceful ends. One way to implement the transfer would be through the formation of joint ventures between Glavkosmos and Brazilian enterprises. Elebra [Brazilian Electronic, Inc.] is conducting negotiations with the Soviets for that purpose, the EMFA chief revealed. He said that the negotiations are at an advanced stage.

CNEN Account With Luxembourg Firm Discussed

Bank Accounts Revealed

51002059 Sao Paulo FOLHA DE SAO PAULO in Portuguese 13 Aug 89 p A-11

[Article by Tanha Malheiros]

[Text] The National Energy Commission (CNEN) owes approximately \$10 million to the Luxembourg firm

Gradel S.A. The debt was incurred in 1981 through the purchase of nuclear materiel produced by Gradel, and has never been revealed by CNEN. The commission—a self-governing entity reporting to the president—has sent \$1.2 million annually to Luxembourg in payment of that debt.

The money has been sent to the Banco di Roma branch in Luxembourg, account number 809848. The account is in the name of Banco di Roma's New York branch, whose research department, contacted yesterday by telephone by FOLHA, claims not to have access to deposit records for its branch in Luxembourg. A deposit of \$700 million by CNEN has been confirmed in the Luxembourg branch, which corresponds to the previous 6 months.

When contacted by FOLHA, Gradel Director Eugene Biver, who has headed the firm for 20 years, denied that the firm had done business with the CNEN. "We have sent brochures and catalogs, but the CNEN never responded," he said last Thursday.

Francesco Micali, an official at Banco di Roma's Luxembourg branch, also interviewed by FOLHA, said he was puzzled about the deposit at the branch's account in New York. According to him, the legal flow of remittances by the CNEN would be through a joint account in the name of the Central Bank of Brazil and the Luxembourg branch of the Banco di Roma.

In the Luxembourg Ministry of Energy on the 17th of last month, FOLHA obtained information on activities performed by Gradel. It is a mechanical engineering and nuclear equipment company, founded in 1965 and located in the city of Steinfort. According to the prospectus released by the ministry, Gradel designs, manufactures, tests, and exports equipment and parts for nuclear fission and fusion. All of Gradel's undertakings follow the highest standards of quality, according to the prospectus.

The firm also operates LWR (light water), HTGR (high temperature gas) and LMFBR (fast breeder) nuclear reactors. Gradel also installs radiation protection, handles nuclear waste, and recharges fuel, among other activities in the nuclear sector. Until 1970 the firm Luxatom operated in Luxembourg, when it was merged with Gradel and the firms Arbed and Paul Wurth. All of them were dissolved, with Gradel the only firm remaining, monopolizing the nuclear sector in Luxembourg, according to the ministry.

According to Eugene Biver, Gradel supplies equipment to member countries of Euratom (the European Atomic Energy Community), comprised of France, Luxembourg, Holland, Germany, and Belgium. Founded in 1958, Euratom has its headquarters in Brussels (Belgium) and has recently received the membership of Portugal, Spain, Italy, Greece, Denmark, Ireland, and the United Kingdom.

In 1981, when CNEN and Gradel began to do business, the commission opened four secret bank accounts referred to as "Deltas," which were revealed by FOLHA in 1986. The "Delta" funds were directed to the parallel nuclear program. They were not deactivated; they still exist with fictitious names.

During the same period the CNEN and the Navy began construction of the Aramar Experimental Center in Ipero (125 km west of Sao Paulo). The center produced enriched uranium to be used in the first nuclear submarine to be manufactured by Brazil and is outside the control of the International Atomic Energy Agency (AIEA) in Vienna, Austria.

Nazareth Will Not Give Interview

FOLHA attempted to interview National Nuclear Energy Commission President Rex Nazareth about the CNEN's debt to the Luxembourg nuclear equipment firm Gradel; but, according to the commission's press agent contact, he will not be available before next week.

The Commission's press agent also stated yesterday that he was unable to provide the CNEN's budget for the last 5 years.

In 1986 the Commission's budget was 530 million cruza-dos—the equivalent at the time of \$36.3 million.

Physicists Call for Explanation of CNEN Debt

51002059 Sao Paulo FOLHA DE SAO PAULO in Portuguese 14 Aug 89 p A-8

[Article by Tanha Malheiros]

[Text] The President of the Brazilian Society for the Progress of Science (SBPC), Physicist Ennio Candotti, 47, and the Director of the Postgraduate Coordination Program (Coppe) at the Federal University of Rio de Janeiro (UFRJ), Physicist Luiz Pinguelli Rosa, 47, have said that the National Nuclear Energy Commission (CNEN) must state the exact sources and uses of the dollars remitted to account number 809848 at the Banco di Roma branch in Luxembourg, as FOLHA reported yesterday.

The CNEN owes some \$10 million, incurred in 1981, to the firm Gradel S.A. in Luxembourg, which manufactures and exports nuclear equipment. The CNEN pays \$1.2 million annually to Gradel.

CNEN President Rex Nazareth could not be found yesterday. The 1982-87 Director of the Reactors Department at the CNEN, Nuclear Engineer Jose Eduardo Salvatore, said he knew nothing about the CNEN business in Luxembourg.

In Pinguelli's view, Minister-Chief of the Military Cabinet General Rubem Bayma Denys should account to society, through the Secretariat of Procurement for National Defense, which controls the CNEN, as should the High Council for National Policy and the Congress.

In his view, the fact that the Banco di Roma account in Luxembourg belongs to the same bank in New York "makes the operation something more nebulous, like a secret service operation." The physicist questions the existence of an account in New York, since the CNEN debt is only with Gradel, located in Luxembourg. It is, he says, "a parastatal operation, since the state has used artifices typical of private enterprise to direct money to undeclared and obscure ends."

Candotti said that, depending upon how the case evolves, he may call a commission to discuss it. Pinguelli said that he already suspects that there is "a triangulation in the purchase of nuclear materiel by CNEN, that could go beyond Luxembourg." He said he does not know, for example, the source of the 5 percent enriched uranium used by the reactor at the Institute for Nuclear Energy Research in Sao Paulo.

The Coppe director said that the payment of dollars is "a continuation" of the reportage that FOLHA published in 1986, revealing the existence of four secret accounts, denominated "Deltas", that were opened in 1981 in the Banco do Brasil. It was that year that the CNEN and Gradel began doing business. Gradel Director Eugene Biver denies doing business with the CNEN.

Accord With FRG To Be Renewed

51002061h Sao Paulo O ESTADO DE SAO PAULO in Portuguese 30 Aug 89 p 11

[Article by Rubens Santos]

[Text] Brasilia—West Germany's secretary of science and technology, Gebhard Ziller, will return to his country tomorrow convinced that the nuclear accord with Brazil should be renewed, despite differences and the foiled attempt to force Brazil to sign the Nuclear NonProliferation Treaty (NPT). "The accord will be renewed and, until then, the two countries will be surmounting the present and future difficulties," declared Ziller, at the closing of the 18th Meeting of the German-Brazilian Joint Commission on Scientific and Technical Cooperation, at Itamaraty. The extension of the nuclear accord between Brazil and Germany will be renewed for 5 more years, in November 1990.

Despite the apparent elimination of the main differences, the Germans will return to their country with another matter to be resolved. They will have to convince their Parliament that Brazil, although it remains decided not to sign the NPT, is complying with all the specifics upheld in the accord. Ziller added: "I am satisfied with the positions assumed by the Brazilian Government to the effect that the nuclear program is only for peaceful purposes. But my task will be to convince them when I return."

The origin of the German mission's difficulties lies in the charge by the Social Democratic Party (SDP) that Brazil is using the bilateral accord to attain military objectives. Since the contract signed in 1975 calls for a 12-month

period before each renewal, for charges of nonfulfillment of terms (the method found for cancelling the accord), the party's action caused an impasse.

The mission headed by Gebhard Zeller had other intentions. At a secret meeting between him and Ambassador Paulo de Tarso Flecha de Lima on Monday morning, before the opening of the 18th Joint Commission Meeting, his purpose was to pressure Brazil to adhere to the NPT. This was a more aggressive approach, which ended up thwarted by a harsh statement from Flecha de Lima during the luncheon held for both groups, in which he reaffirmed Brazil's sovereignty.

The NPT, signed in 1968 during an assembly of the International Atomic Energy Agency in Vienna, contains 11 articles and has an obvious concern for preventing the nuclear arms race throughout the entire world. Rex Nazare, chairman of the National Commission for Nuclear Energy (CNEN), explained: "What one observes is the signatory countries accelerating that race and, on the other hand, limiting the access of other countries to the mastery of nuclear technology for peaceful purposes."

The Reasons for the Disagreement

The German Parliament (Bundestag) suspects that the Brazilian nuclear program has military purposes and not peaceful objectives. West Germany is a signatory of the Nuclear Non-Proliferation Treaty, and Brazil is not. The restructuring of the Brazilian nuclear program, with the deactivation of NUCLEBRAS [Brazilian Nuclear Corporations, Inc], is not clear to the Germans. Institutions in German civilian society are also debating the accords made with the developing countries. The constant delays in the work on the Angra II and III nuclear power plants.

Air Force Confirms Test Site in Para

33420087n Sao Paulo FOLHA DE SAO PAULO in Portuguese 17 Aug 89 p A4

[Text] A letter from Aeronautics Minister Octavio Moreira Lima to Federal Deputy Gerson Peres (PDS-PA) [Social Democratic Party congressman from Para State] has confirmed the existence of an Armed Forces test field in the Cachimbo mountain range, in southeastern Para State. According to the minister, the area was reserved for installation of the complex on 7 March 1978, by presidential decree No 83,240. The first facilities were inaugurated in November 1987.

The deputy's request was prompted by a report that was published last January by the British magazine SOUTH. The item increased the speculation about the probable existence of a nuclear test field in the Cachimbo hills. Speculation started in 1987, when the National Commission for Nuclear Energy (CNEN) attempted to ship radioactive waste from Goiania to Cachimbo.

Last May, during a meeting in Manaus of the eight presidents who are parties to the Amazon cooperation

treaty, President Jose Sarney, in speaking to FOLHA, denied that there was anything more at Cachimbo than a landing field and some aids to air navigation maintained by the Ministry of Aeronautics. In the letter to Peres, however, Moreira Lima states that adjacent to the Col Haroldo Velloso Flight Protection Department of Cachimbo is a test field "intended for testing and experiments of interest to the Ministry of Aeronautics."

In the 10th of 11 points in the letter, he states that "before establishing the test field, the area was exhaustively studied in terms of its climate, flora, fauna, soil, subsoil, and population, in order to disturb as little as possible its ecosystem and to forestall military construction in areas that are rich in mineral resources." In the next point, the minister states that the field is maintained for tests of "conventional weapons" developed by the Aeronautical [as published] Technical Center (CTA).

Attorney Luis Igrejas of Nuclear Industries of Brasil, S.A., (INB), a firm associated with the CNEN, has been in Belem for 2 years, pressuring the state deputies not to approve during the first and second round of the drafting of the state constitution two articles that would prohibit nuclear energy activities in Para.

The reporter on the constitution project, Deputy Zeno Velloso (PDS), met with Igrejas yesterday and said that the attorney came to Para as a spokesman for the CNEN lobby (connected with the National Defense Secretariat of the Office of the Presidency of Brazil—Saden). Igrejas is supposed to have said that "if the states approve measures that prohibit the storage of radioactive waste, it will not be feasible to carry out national nuclear energy policy."

Igrejas denies any lobbying and says he is "only trying to show the deputies that the text of the draft conflicts with the Federal Constitution." He says that, according to Article 22, Section 26 of the Constitution, "authority to legislate on nuclear energy activities of any type is reserved to the Union."

FOLHA Published Report in 1986

In August 1986 FOLHA published an exclusive report stating that underground facilities were being built in the Cachimbo mountains (in southeastern Para State, near the border with Mato Grosso) for use in various kinds of nuclear testing and for storing the atomic waste from nuclear power plants. The area was acquired by the Armed Forces during the 1970's to use as a war materiel testing ground. The report said that an initial well had already been constructed the month before.

Cachimbo was the first major revelation concerning the nuclear program being carried out by the military, parallel to the official agreement with Germany. In December 1986, FOLHA disclosed in another exclusive story that the CNEN had a secret fund in Banco do Brasil to pay for the parallel nuclear program.

The Armed Forces General Staff (EMFA) admitted at the time that construction was going on in the Cachimbo hills for "testing of material and equipment to develop aerospace capability, in the interests of national security," according to an official note sent to FOLHA by Planalto Palace and by EMFA, signed by Adm Jose Maria do Amaral Oliveira, minister of state/chief of EMFA. However, the letter denied the presence of underground structures for nuclear testing at Cachimbo. In the document, the minister noted that Brazil had signed the Treaty of Tlatelolco—for the prohibition of nuclear weapons in Latin America, signed by 21 Latin American countries on 14 February 1967—in which it promised to use nuclear energy only for peaceful purposes.

The possibility of Brazil's using nuclear energy for non-peaceful purposes attracted international attention. At the time, the Minister of Foreign Affairs of The Netherlands—a signatory country to the nuclear nonproliferation treaty—asked the Dutch embassy in Brasilia for a report on the stories published by FOLHA. The Argentine Government treated the news as a national security matter.

Rocket-Launching Base Prepared in Alcantara

PY1409015089 Rio de Janeiro O GLOBO in Portuguese 11 Sep 89 p 15

[By Jose Eustaquio de Freitas]

[Text] Sao Jose dos Campos—Within 2 and ½ years, Brazil will have a sophisticated rocket launching base that will be among the world's best in terms of location. Being very close to the Equator, it will allow substantial fuel savings. This Rocket Launching Center [Centro de Lancamento de Foguetes] is currently under construction on a peninsula in Maranhao State, north of the historic city of Alcantara.

Work at the Rocket Launching Center has been slowed by a lack of funds and by a 55-percent cut in the budget of the Complete Brazilian Space Mission [Missao Especial Completa Brasileira], but in January 1990 President Jose Sarney will dedicate the facilities that have already been completed—one-third of the total program scheduled—by launching a Sonda III rocket. Despite the budget cuts, the schedule, which calls for work to be completed and the center to be ready for testing by December 1991, has been maintained.

The launching of small rockets, such as the Sonda II and Sonda III, has been planned for the first half of 1990 as part of the testing program. The tests also include the launching of the 11-meter-long Sonda IV rocket—the largest rocket ever built in the country. Sonda IV equipment is going through its final tests and trials.

According to the documents prepared by the Aeronautics Ministry, the Rocket Launching Center of Alcantara will not be just a base for rockets. The idea is to create there a sort of alternative spaceport [espacoporto] for

U.S. and European space shuttles. The base will also be integrated into a system of international space cooperation, helping to track rockets, satellites, spaceships, and space probes launched by other countries.

The principal mission of the base will be to launch the first four Brazilian-made satellites: two for collecting meteorological data, and two for remote sensing. Those satellites are under construction at the Institute for Space Research [Instituto de Pesquisas Espaciais]. They will be launched to an 800-km orbit beginning in 1992.

Brazil has a launching base next to the Air Base in Natal, Rio Grande do Norte, where more than 300 launches have been made since 15 December 1965. No rockets bigger than the Sonda IV can be launched at this base, because the Natal urban area has dangerously encroached on the base facilities, which therefore no longer meet international safety requirements. Since very large investments would be necessary to handle bigger rockets there, the Brazilian Space Activities Commission decided to build the Alcantara base, which is located on a 400-square-kilometer tract. All the people residing near this area have been moved to distant villages built by the Air Force.

The chosen site is appropriate for placing satellites in polar or equatorial orbits, without hurting the environment, with less interference from adverse weather conditions, and with a large degree of safety. Being close to the equator, the base will allow a large savings in fuel, since the earth's rotation imparts additional launching speed, so that larger satellites can be placed in orbit with less energy consumption than would be required at bases further from the equator.

In Alcantara, buildings for rockets preparation, assembling, and fueling are under construction, as well as buildings for final satellite preparation, control and tracking centers, logistical support, and personnel lodging. Part of the required equipment, such as antennas and radars with a range of over 5,000 km, have already been bought and should be in place by mid-1990.

Nuclear Submarine Ready 'Within 5 or 6 Years'

PY1509184589 Sao Paulo FOLHA DE SAO PAULO in Portuguese 12 Sep 89 p A-6

[Text] Rio de Janeiro—The first Brazilian nuclear submarine will be completed within 5 or 6 years, and not 10 years as the Navy has been reporting. This information was supplied by Rear Admiral Roberto de Oliveira Coimbra, the commander of the Navy destroyers force. Since 1988, the research center of Aramar, in Ipero (125 km west of Sao Paulo), has been enriching uranium to the required 20 percent to be used as fuel by the submarine. Aramar is part of the parallel nuclear program and is outside the safeguards of the International Atomic Energy Agency of Vienna, Austria.

The National Commission for Nuclear Energy (CNEN) has left aside other studies to concentrate more on the

parallel program, particularly to this project with the Navy. Two years ago an accident, involving a Cesium-137 capsule, occurred in Goiania, killing four persons. At that time the CNEN announced that it was studying dump sites for nuclear and hospital waste, but they were not implemented.

The CNEN has four accounts—which were called “Deltas” until 1986—within the parallel nuclear program. Their funds are allocated for secret activities, including those of the Armed Forces. The parallel program also includes a facility in Serra do Cachimbo (PA) [Para State].

The CNEN is working on a project to build reactors for the Army at the Army Technological Center [Centro Tecnológico do Exército] (Cetex) Marambaia (RJ) [Rio de Janeiro State]. At its Nuclear Engineering Institute (IEN) in Ilha do Governador (northern Rio de Janeiro), the CNEN keeps three sodium circuits that were purchased in 1981 from an Italian company for about \$10 million (30 million new cruzados at the official rate of exchange). This debt is being paid, including interest charges of about \$500,000 (or 1.5 million new cruzados) per annum, but the circuits have not even been assembled.

Government Selects Sites for Nuclear Waste Dumps

PY1409005989 Brasilia Domestic Service in Portuguese 2200 GMT 13 Sep 89

[Excerpt] The National Commission for Nuclear Energy has listed 18 sites which can be transformed into long-term nuclear waste dumps, seeking to solve the problem facing the state of Goias where radioactive waste has been kept in a temporary waste dump for the last 2 years.

Jose Reis, press secretary of (?ACNEI [expansion unknown]) in Rio de Janeiro, has said that the selection of the sites is a political problem and that the technical problem has already been resolved. [passage omitted]

Navy Calls for Environmental Impact Report

PY1509220789 Sao Paulo FOLHA DE SAO PAULO in Portuguese 13 Sep 89 p A-4

[By Tania Malheiros]

[Text] Rio de Janeiro—The Navy has called for bids for designing an Environmental Impact Report (RIMA) on the first National Pressurized Water Reactor (RENAP-1). The RENAP-1 has already been designed and will be built by the Aramar Experimental Center (125 km west of Sao Paulo). Fourteen local enterprises have submitted their offers, and the winning offer will be announced within the next 30 days.

In Sao Paulo, the Coordinating Board of Special Navy Projects (COPESP), through Lieutenant Cesar de Piere, has announced that it cannot publish the names of the bidders.

FOLHA, however, has learned that Hidroservice, Pronom, Sondotecnica, and Engevix are among the bidders.

De Piere said that RENAP-1 will allow the Navy to master general reactor technology. RENAP-1 will have a generating capacity of approximately 100 megawatts and it may be used for propelling a nuclear submarine or for producing electricity. The Rima will be designed over a period of approximately 1 year. The offers were submitted on 24 July 1989.

National Nuclear Energy Commission (CNEN) president Rex Nazareth has said that the pressurized water reactor (PWR) has been chosen because it is the world's most widely used reactor and because it was developed as a result of the naval propulsion program, in which the navy has an interest. The CNEN is also participating in this Navy project.

Navy Minister Admiral Henrique Saboia said 3 months ago that the RENAP-1 will serve as model for the construction of the RENAP-2 that will be fitted in the nuclear submarine that is being built by the Navy at its arsenal in Rio de Janeiro. According to Rear Admiral Othon Luiz Pinheiro, who is the COPESP president, private enterprises are already manufacturing most of the RENAP-1 components. The Navy minister said that the Brazilian nuclear submarine will be of German design, although the Navy is interested in developing its own design.

Aramar participates in the parallel nuclear program. When this center was officially dedicated in April last year, Adm Saboia said: “The center has an environment monitoring system, yet neighbors have voiced their concern. There is a history of radioactive accidents.”

MEXICO

Environmentalists Criticize Nuclear Plant Testing

PA0409031189 Mexico City THE NEWS in English 25 Aug 89 pp 1, 5

[Text] Reactor Numer One at the Laguna Verde (Veracruz) nuclear power plant Thursday reached a high of 30 percent generating capacity, the Federal Electricity Commission (CFE) announced.

Reacting swiftly to the announcement, several environmental protection groups decried the government's “lack of willingness” to shut down the highly controversial Laguna Verde operation, in the wake of what the groups call “serious accidents” that have allegedly occurred in the past few weeks during the plant's startup procedures.

The CFE said this week's power generation tally at Laguna Verde reached 11,076 megawatts per hour, which is still a fraction of nationwide power needs.

Earlier, the CFE has acknowledged claims by ecological groups that residual water containing radioactive material from the plant was being dumped into the Gulf of Mexico. The CFE claimed the residual water was non-radioactive, and pledged it would discontinue the practice.

"Liquid and gas emissions from the plant have remained at insignificant levels all week. [sentence as published] Liquid waste was only at 7.3 percent of the authorized level, while gas emissions were fractional (less than 1 percent). At the same time, environmental radioactivity has been at insignificant levels," the CFE said in a statement.

Responding to allegations that an unusually high number of emergency stoppages in the operation of Reactor Number One is proof of the plant's inefficiency and potential danger, the CFE said that virtually all stoppages have been due to the highly sensitive nature of the computerized security equipment that runs the reactor. "Stoppage number 14, which occurred this week, was caused by an erroneous low-level reading. Most others have been like that," said the CFE.

Radioactivity at Nuclear Energy Plant Increasing

PA1909235689 Mexico City EXCELSIOR in Spanish
8 Sep 89 pp 1, 16

[Report by Nidia Marin]

[Text] The trial runs of the Laguna Verde nuclear energy plant are causing an increase in the radioactivity in the environment and the ocean, in the area around the nuclear energy plant, and along the coastal border all the way to the port of Veracruz. From 1 April to 24 August of this year, approximately 922,629 liters of radioactive liquids have been dumped into the ocean. The quantity of gases released into the atmosphere have been such that it is already possible to measure "the effect and increase of radioactivity in the regional environment."

The Group of 100, through Ofelia Medina, Homero Aridjis (president of this association of ecologists), and Feliciano Bejar, reported this information based on data provided by peasants, cattlemen, fishermen, and technicians. The group reported that General Electric originally scheduled the trial run to last 158 days (from October 1988 to April 1989), but now it has been reported the trial run will last through the first months of 1990. General Electric scheduled five emergency shutdowns for the entire trial period, which includes six different phases. Up to now, however, there have been 16 shutdowns, and this is still the second phase. "All this amid a tense atmosphere of relations between the general superintendency, the operations superintendency, and the technicians who have to work under inadequate conditions."

Regarding the radioactive liquids dumped into the ocean, the ecologists pointed out: "Veracruz cattlemen and fishermen report that Juan Eibenschutz, deputy director of the Federal Electricity Commission [CFE], admitted the truthfulness of the figures reported. However, he said the CFE has the right to dump these and even greater amounts of radioactive liquids into the sea. [no closing quotation marks as published]

The CFE deputy director added: "The reason for the production of radioactive waste in a volume that exceeds

the plant's waste processing capacity is due to fissures in the fuel casings which permit the fission products to leak into the cooling water. Another reason for it is because of the excessive amount of corrosive products activated by the natural decay of materials which make up the internal components of the reactor. And all of this is worsened by the incompetent and irresponsible way in which the process to recycle the water to cool the reactor is carried out."

Up to the end of August, the personnel of the Monitoring and Environmental Dosimetry Laboratory (LAMDA) had not notified anyone that there had been constant releases of radioactive gases into the atmosphere in such amounts that it is now possible to measure the rise in the level in the Laguna Verde area. So far, the nuclear power plant administration has put the blame on defective calibration of the measuring instruments and the incompetence of physicist Angel Valdovinos, the LAMDA director.

The curious thing is that at all the public activities promoting the nuclear power plant in which the physicist Valdovinos took part, the CFE officers always presented him as an example of someone who was professionally very capable, even to such a degree that the precision of his measurements received international recognition on several occasions. Valdovinos' great sin was having coordinated the measurements that served to confirm the reports by Veracruz cattle ranchers, fishermen, and citizens, which refuted the statements of CFE officers who claimed that the area's radioactivity would never increase due to the plant's operation.

Since the middle of 1988, the ecologists noted, Valdovinos had been urging General Superintendent Engineer Rafael Fernandez de la Garza and Operations Superintendent Engineer Jose Francisco Torres to take the necessary corrective measures in connection with radioactive gas leaks and the intentional spillage into the sea of radioactive water.

The ecologists also said: "The overall effect of an increase in the area's radioactivity results in the presence of radioactive gases and particles that circulate and accumulate in the local atmosphere, with very few possibilities of escaping due to the mountainous area that surrounds Laguna Verde. So far, it has been impossible to contain this because of the difficulties in monitoring the leaks—also reported by physicist Valdovinos—due to the malfunctioning of the turbine and the ventilation system of the radioactive waste buildings. This is made worse by the incompetence and the corruption of the radiological protection personnel. For example, according to Annex 1 to the finding FR-2 during inspection 01-28-29-LV, made by technicians of the national security and safety commission: "Radiological protection personnel were seen at the entrance of the dry well, without protective clothing, with the monitors left on the ground, in an area marked as contaminated..." Recently, "the head of radiological supervision was fined for falsifying reports."

Another effect on the area, attributable to the operation of the nuclear power plant, is poisoning of the sea due to the

huge amounts of chlorine dumped into it to prevent the accumulation of marine growth in the condenser's seawater inlet.

The ecologists added: "There are other cases involving personnel. Technical Support Engineer Javier Barrera Quirarte presented to the general and operations superintendents the document 'Diagnosis of the Laguna Verde Situation,' signed by intermediate and high-level technicians (including physicist Valdovinos). This document, drafted a year ago, just before the plant's operational trial runs began, requested that the loading of fuel be delayed until maintenance, renewal, and adjustment work as well as training of personnel had been completed, especially the training of those working in radiological protection and waste handling. The degree to which these technicians were right can be confirmed by 13,986 emergency maintenance requests (not complied with) during 1988, and 5,126 from 1 January to 27 April 1989. [no closing quotation marks as published]

Reactor number two has been "cannibalized" for the parts, components, and even complete systems that have been removed to replace those damaged by simple neglect, premature wearing-down, or operational destruction during the trial start-up runs of reactor number one. According to the technicians critical of Laguna Verde, the cost of replacing all this material was \$800 million up to August 1988—23 percent of the plant's total construction cost, the ecologists said.

The ecologists concluded by saying: "Any person of normal intelligence will agree that enough reasons exist for the Executive Branch to order the immediate suspension of the Laguna Verde power plant's contaminating trial start-up runs, and that an investigation must be started to find out who is responsible. The backers of this plant, which is causing the country so much harm, must be punished."

INDIA

India Concerned Over Pakistan's Nuclear Buildup

51500183 Calcutta *THE TELEGRAPH* in English
4 Aug 89 p 5

[Article: "India Still Worried Over Pakistan's N-Build Up"]

[Text] New Delhi, Aug. 3 (UNI, PTI): The defence minister, Mr K.C. Pant, today said Pakistan's weapons-oriented nuclear programme and on-going military buildup continued to cause concern to India even though the international security environment had shown a shift from confrontation to dialogue.

Inaugurating the biennial defence quality conference here, Mr Pant regretted that the US remained apparently committed to its massive aid to Pakistan despite its declared policy of not providing assistance to nuclear weapons states.

Mr Pant also underscored the importance of self-reliance in the field of weapons and related equipment to ensure national security at all times. Therefore, there was need for greater coordination among various defence agencies to translate the fruits of research and development activities into bulk production of defence items.

Nuclear Research Center Maintains Claim on Cold Fusion

51500182 Madras *THE HINDU* in English
7 Aug 89 p 9

[Text] New Delhi, Aug. 6—While world over the claims made a couple of months ago, that cold nuclear fusion of deuterium nuclei, a heavy isotope of hydrogen, could be achieved with modest table-top experiments, seem to be slowly dying out, scientists of the Bhabha Atomic Research Centre (BARC) have continued to stick to their earlier claims and believe that what they observe in their experimental set-ups is certainly cold fusion.

Cold fusion refers to possible fusing of light nuclei like hydrogen and its isotopes—deuterium and tritium—at room temperatures in contrast to fusion processes in stars like the Sun at temperatures of billions of degrees centigrade and in the billion dollar exercises till now to simulate this in controlled conditions in huge laboratory set-ups.

"There is certainly cold fusion: what is lacking is an explanation for it. But it is not an inexplicable phenomenon," Dr P.K. Iyengar, Director of the BARC, told *THE HINDU* some days ago. "We have seen effects of fusion both in heavy water electrolysis and high-pressure experiment mainly with titanium as the deuterium absorbing metal. Heat generation is probably there but what is significant is we see the fusion by-products, neutrons and tritium, in our experiments," he said.

Widespread scepticism: The above assertion of Dr Iyengar notwithstanding, the initial excitement and enthusiasm among scientists all over the world—which all began with simple electro-chemistry experiments of electrolysis of heavy water carried out by Drs Stanley Pons and Martin Fleischmann at the University of Utah, U.S. and by Dr Stephen E. Jones and company at the Brigham Young University, U.S. in February—about a possible cheap source of energy has certainly given way to widespread scepticism.

The state of affairs can be best judged from the editorial comment in a recent issue of *NATURE*: "It seems the time has come to dismiss cold fusion as an illusion of the past four months or so." But Dr Iyengar is far from dismissing BARC's findings as any kind of illusion. It must be pointed, however, that the BARC experiments were not part of the 83 experiments from all over the world that were reported in the most substantive conference on cold fusion that took place in Sante Fe, U.S. between May 23 and 25. Dr Iyengar, however, said that he presented the results recently at a conference on "Emerging Nuclear Energy Systems" in Karlsruhe, West Germany.

No theory to fit data: According to a summary of the conference, there had been roughly equal number of papers with positive and null results. Pointing out that the so-called positive results had many explanations, it said that one did not have a theory that fitted all data. The equivalent question it posed was: "Does anyone have a theory that will allow two deuterium nuclei to come close enough together that they have a good chance of fusing?"

Stating that most, though not all, workers in the field realised that cold fusion will never be of any practical use for power production, it went ahead to remark: "Of purely academic interest is the question whether does there exist cold fusion at some very low level (a billionth or a trillionth or a billionth-billionth of a Watt)? Clearly Utah level is excluded by the data, but some hope it might occur at the BYU level, but again there are good experiments which find no neutrons at much lower levels."

BARC experiment: The curious fact about the BARC claim is that one is not talking here of low levels of neutron bursts, which are difficult to be distinguished from fluctuations in the cosmic ray neutron background (with a rate of about one neutron/min). "We do not have to worry about going underground like the French or build shields against the background. Our neutron bursts are ten thousand times the background. This is the court in the high-pressure experiment. Levels in our electrolysis experiments are much lower," Dr Iyengar said.

The electrolysis experiment of BARC uses titanium instead of palladium in the Pons-Fleischmann set-up. The high-pressure experiment, on the other hand, is conceptually similar to the Frascati experiment of Prof

F. Scaramuzzi and also uses titanium. Similar experiments have also been performed by Dr Howard Menlove of Los Alamos Laboratory. However, the neutron counts of both these experiments are far below the BARC claims. They would seem to be more consistent with BYU levels of neutron generation. While Prof Scaramuzzi sees very short neutron bursts (lasting few micro/sec.) with rates of tens of neutrons/second, Dr Menlove sees 100 microsec bursts of 10 to 300 neutrons/sec.

The underlying principle in the high-pressure experiment is high-temperature degassing of hydrogen locked in titanium by heating it to about 200°C and more and then pumping in gaseous deuterium under pressure of four to five atmospheres only. (Dr Menlove used up to 50 atm. pressure.) On cooling one sees bursts of neutrons. This, according to Dr Iyengar, is due to fusion of deuterium nuclei as the titanium metal lattice rearranges itself as it cools.

Fusion process: To fuse the deuterium nuclei have to overcome the electrostatic barrier between them created by the force of repulsion between the positively charged protons in their nuclei. Dr Iyengar also believes that he has some kind of 'hand-waving' argument for the fusion process which aims to explain why this occurs only in solids, like titanium or palladium, and not in free space.

"The fact that we see more tritium than neutrons in our experiments is important for this explanation," Dr Iyengar says. Deuterium fusion proceeds through two modes: one giving rise to tritium as by-product and the other to neutron. Under normal conditions these proceed with roughly equal probability. If one seems more tritium then it implies that the neutron mode is, for some reason, suppressed. Dr Iyengar's conjecture, based on J.R. Oppenheimer's work in 1935, is an explanation for this.

The thrust of the argument is that within solids, deuterium nuclei have very low energy and, therefore, their wave spread, as implied by quantum theory, is much larger, of the order of an angstrom (a hundredth-millionth of a cm.). This is nearly a million times more than the spread in free space and, therefore, its charge distribution cannot be treated as that of a point particle. The increased wave spread reduces the strength of the barrier and increases the overlap of two deuterium nuclei. This enhances the probability for neutron in one nucleus to tunnel and fuse with the other deuterium nucleus, while the proton remains as a 'spectator', resulting in tritium production.

Next phase: "It is the secondary fusion reactions that produce the neutrons and therefore, the neutrons we see would have an energy of 14 million electron Volts," he says. The next phase of the BARC experiment is to measure these neutron energies and it is to be seen whether they predominantly have 14 MeV energy or not. Asked about detecting helium-3 or helium-4 nuclei which should also be observable as by-products he said that the mass spectrometers used are not sensitive

enough to distinguish them from tritium and more sensitive experiments are being planned.

It must, however, be pointed out here that in a recent calculation of fusion in solids, under some different assumptions, Drs Steve Koonin and M. Naucenberg have estimated that they would be about 10 billion times faster than previous estimates for the rate of proton-deuterium fusion mode rather than neutron-deuterium mode which Dr Iyengar would like to have. But even this enhancement, in the opinion of the two researchers, is not enough to produce Utah levels of energy generation.

Nuclear Power Station Discussed at Madras Meeting

51500184 Madras *THE HINDU* in English
15 Aug 89 p 3

[Article: "Chernobyl-Type Accident 'Cannot Occur' at MAPS"]

[Text] Madras, Aug 14—A Chernobyl-type of nuclear accident "cannot occur" at the Madras Atomic Power Station, Kalpakkam, because the nuclear reactors here have double-containment each to prevent radioactive contamination of the environment, according to Dr C. V. Gopinath, Head Safety Research and Health Physics, Indira Gandhi Centre for Atomic Research, Kalpakkam.

At a workshop on "Relevance of nuclear power for Tamil Nadu," organised by the Rotary Club of Adayar and the Rotary Club of Madras Central, he said the Chernobyl reactor did not even have a single containment. But the Kalpakkam reactor containment building "could withstand the worst possible accident." Besides, this building was enclosed in another containment building. Also the various systems had effective shields.

This multiple containment philosophy was an effective barrier against release of any radioactivity. The waste disposal methods where stringent waste was processed, put in steel-welded containers, which were again encased in steel containers. The chances of the radioactive waste breaking "all these barriers and reaching the biosphere are practically zero."

Radioactivity was not new to mankind. It existed in the environment and even in the human body. Human beings could tolerate certain amount of radioactivity. Radiation from a nuclear power plant was hardly two per cent of the natural radiation. The concern of the nuclear scientists in the country was that the exposure from nuclear plants should be well within specified limits. The design of a nuclear power plant even took into account the mistakes that operators might make. As human error could not be ruled out, emergency drills were conducted regularly at Kalpakkam, Dr Gopinath said.

Mr S. Rangarajan, Chief Superintendent, MAPS, said the first unit at Kalpakkam had generated 6,000 million units of electricity from 1983 and the second 3,000

million units from 1985. Though there had been shut-downs, the units had done well and the revenue from them was Rs. 300 crores against the entire project cost of only Rs. 250 crores.

There had been some "real problems" this summer in both the units. "Something happened inside the reactors which we did not anticipate." But both the units were re-started from June and were now working at 50 per cent capacity. "Our philosophy of operation is safety first and this discipline had been built in." There were enough training programmes, manuals and instructions to get an update on safety procedures. Factors such as the night duty of the reactor operator were also taken into account. The possibility of human error was being reduced by working operators on mock-ups.

Dr M.A.R. Lyengar, Director, Environmental Survey Laboratory, Kalpakkam, said there was no such thing as radiation-free environment. Natural sources accounted for 87 per cent of the radiation that human beings received. There was natural radioactivity in granite, marble, concrete, etc. Wood was least radioactive. The Environmental survey Laboratory was continuously doing surveys on sea-water, grass, air, animals, etc.

While the air activity fluctuated before the Kalpakkam reactors became operational because of Chinese nuclear tests on September 26, 1976 and September 17, 1977, the radioactivity level was low after the units were commissioned except during the Chernobyl accident. Coal-fired power plants threw out quite a good amount of radioactivity but this did not get the attention it deserved.

Mr N. Srinivasan, former member, Atomic Energy Commission, said the power generation options for Tamil Nadu should be used profitably and with minimum side-effects. The decisions on the options would have an important bearing on the first decade of the next century. Safety-designs in nuclear power plants had reached high-levels.

Mr T. V. Antony, chairman, Tamil Nadu Electricity Board, said the increase in power generation in Tamil Nadu in the 1980s was 6.5 per cent. The 13th viz., the last Power Survey estimated that the increase henceforth should be 8.5 per cent but the State Government was planning for 10 per cent growth. The installed capacity now from hydel, thermal sources and from the Centre's allocation was 5,120 MW but the actual peaking availability was just 2,600 MW.

If the State were to survive without industrial power cuts but with restrictions on consumption by agriculture, it needed 3,000 MW. But without any restriction it needed 3900 MW. The State could keep up with the demand for more power by generating an addition of 350 to 400 MW during the Eighth Plan.

Mr A. Aravamudan of the Environmental Society of Madras said the anti-nuclear movement had gained momentum in Europe after the Chernobyl disaster.

Sweden had decided to phase out its nuclear plants by the year 2010. About 5,000 to 35,000 people might additionally die of cancer in Europe over the next 70 years because of the Chernobyl accident.

Mr V. Anantharaman, president, Rotary Club of Madras Central and Mr Ramesh Sankaran, president, Rotary Club of Adayar, welcomed the gathering.

Center Uses Thorium To Make Uranium Isotope

BK0809112989 Delhi THE HINDUSTAN TIMES in English 31 Aug 89 p 12

[By Rajendra Prabhu]

[Text] New Delhi, Aug. 30—India is one step nearer utilisation of its vast thorium deposits in generating power with the development and testing of uranium-233 fuel plates at the Bhabha Atomic Research Centre [BARC] in Bombay recently.

"In the whole world, it is the first time that thorium enriched fuel is being made," says Dr P.K. Iyengar, director of the BARC. He was speaking to this correspondent in a telephonic review of the event.

Thorium, available in plenty on the beaches of the country, is not itself a nuclear fuel. It has to be irradiated with fast neutrons to convert it into one of the isotopes of uranium, U-233, the most fissile of these isotopes which has a high burn efficiency.

Dr Iyengar said that the metallurgy of this thorium conversion and fuel construction "is well known" but it was only in India that it has been attempted with success. The aluminium clad fuel plates would be tried in the fast neutron reactor Kamini at the Kalpakkam research centre of the BARC in Tamil Nadu. By the year end this reactor would be critical with the thorium derived fuel.

This would be the final proof that the third generation nuclear reactors proposed to be set up in the early years of the coming century, would be a workable proposition. The thorium would be converted using the fast breeder reactors being set up in the second generation atomic power stations. Also thorium uranium mixtures would be tried in the thermal (first generation) reactors on an experimental basis.

The current experiment is with low level power reactor using thorium derived fuel. But large sized reactors would be later set up to take full advantage of the high efficiency of U-233 fuel.

There are also plans to try thorium conversion in the high energy Pelletron Accelerator built at the Tata Institute of Fundamental Research by the BARC. This will be done through using neutrons from fusion reactions induced in the accelerator. If successful, this experiment would contribute significantly to development of nuclear power in the second decade of the next century.

India would have bypassed one stage in thorium usage and reached a low cost method of generating nuclear power on a massive scale with a fuel cycle that could run for several decades at a stretch. The net meaning of successful thorium use is that India is unlikely to run out of its nuclear fuel for a long time to come.

IRAN

Atomic Energy Official on Exporting Uranium

NC1509221389 Tehran RESALAT in Persian
10 Sep 89 p 7

[From the Economics Desk]

[Text] There are only 10 countries in the world that have high-grade uranium and we are one of them.

According to the RESALAT correspondent this was said by Dr Amrollahi, head of Iran's Atomic Energy Organization, in an interview with the nuclear energy publication [not further specified]. He added: We are currently prospecting for uranium in Saghand, Yazd. This has been going on for the past 5 years and, God willing, we are on our way to exploiting this mine.

He said: The Saghand mine is one of our country's largest uranium mines. It is not possible to disclose exact figures on its reserves at this time because whatever estimate we provide may be an anomaly [preceding word in English], and the reserves may be much greater.

Dr Amrollahi added: It is a source of pride for us today that the Saghand mine is one of the world's largest uranium mines. As to when the mine will become operational and whether this uranium mine is similar to others or requires any special procedures, he said: One kg of uranium sells for \$30 to \$100 on the international market today. Our mine, with an estimated 5,000 tons of uranium, is obviously a source of great income.

He continued: I hope that with this uranium we will be able to develop our nuclear energy industry and become a major exporter as well.

Regarding Iran's international uranium standing Dr Amrollahi said: At present no specific ranking has taken place but we can claim that we are 1 of 10 countries that have high-grade uranium.

When asked whether ample uranium reserves are present in other areas he said: We have resources in the cities of Esfahan, Azerbaijan, Khorasan, and Sistan va Baluchestan, but none of these can compare with the Yazd reserves.

Ministry Announces Production of New Missile

LD1309213289 Tehran in English to Europe
1930 GMT 13 Sep 89

[Text] The production of a particular surface-to-surface missile made in Iran has started with the efforts of the

experts of the engineering research center of the Ministry of Construction Jihad. Announcing this in a press conference, the deputy minister of construction jihad for training and research said besides the production of this type of missile which is made for the first time in the Islamic Republic of Iran, 250 different projects are also under way to meet the defense requirements of Iran. He added a particular type of armored personnel carrier and motor boat have also been made and the new motor boat will be launched in sea tomorrow.

IRAQ

Explosion at Missile Factory Reported

700 Iraqis, Egyptians Killed in Blast

JN0609061089 Paris Radio Monte Carlo in Arabic
0500 GMT 6 Sep 89

[Text] In today's issue, the British newspaper THE INDEPENDENT revealed that 700 Iraqis and Egyptians could have been killed in a huge explosion at a secret military industrial complex 60 km away from Baghdad on 17 August. Citing foreign and Middle Eastern diplomatic sources, the paper said the explosion caused a big fire that burned for 7 days before it could be extinguished. The paper noted that the explosion could have been the result of a rise in temperature of certain equipment and that there are no indications that it was an act of a sabotage.

Further Reporting on Factory Disaster

JN0609072889 Paris Radio Monte Carlo in Arabic
0500 GMT 6 Sep 89

[Text] Citing unidentified sources, the British newspaper THE INDEPENDENT says that about 700 Iraqis and Egyptians were killed in a huge explosion at an Iraqi factory for the manufacture of missiles situated 60 km away from Baghdad. The explosion caused a huge fire that burned for 7 days before it could be extinguished. The paper noted that the factory had been producing amended versions of the long-range Soviet Scud-B missile.

Egyptian Official Confirms Explosion

JN0609162289 Paris Radio Monte Carlo in Arabic
1500 GMT 6 Sep 89

[Text] An Egyptian military spokesman said in Cairo today that an explosion took place in an Iraqi military industrial complex in Iraq during the second half of last month.

Before this statement, carried by REUTER, the British newspaper THE INDEPENDENT reported today that such an explosion took place, killing about 700 people.

Embassy Comments on Report

JN0709171489 Baghdad INA in Arabic
1610 GMT 7 Sep 89

[Text] London, 7 Sep (INA)—In a statement today, the Iraqi Embassy in London denied a report published yesterday by the British newspaper THE INDEPENDENT and carried by news agencies concerning an explosion in one of Iraq's military factories on 17 August. The paper alleged the explosion resulted in the deaths of 700 people, including a number of Egyptian experts.

The embassy said in its statement: In the afternoon of 17 August, fire broke out in a storage tank containing a highly inflammable petroleum byproduct at a factory south of Baghdad. Fire brigade and civil defense teams were able to control the fire. The incident occurred at a site where explosives—which were used for civilian purposes—were on board a carrier that was on its way to the construction site of a dam in northern Iraq. This resulted in an explosion that killed 19 firemen and civil defense personnel. The explosion also smashed the windows of passing buses and nearby offices, resulting in mostly minor injuries.

The statement said that all of the victims were of Iraqi nationality and that it took firemen and civil defense personnel only hours to extinguish the fire and bring the situation under control. The statement adds: The investigation has shown that the cause of the fire was the high temperature on that day that resulted in the burning of the inflammable petroleum material. The material damage was not great, the statement adds. This is in addition to the fact that there were no Egyptian citizens among those killed as THE INDEPENDENT reports.

The Iraqi Embassy statement states that there is no plan to develop Condor missiles in cooperation with any other state, including Argentina. The statement says: The purpose of mentioning Argentina in the newspaper's report is to stir up British public opinion against Iraq because the tense relations between Argentine and Britain are well-known.

The Iraqi Embassy statement notes that Iraq has proven that it possesses the technology to manufacture medium-range missiles using its own intrinsic capabilities, capabilities which Argentina does not possess at present.

MENA Reports Official Denial

NC0709141689 Cairo MENA in English
1152 GMT 7 Sep 89

[Text] Cairo, Sept 7 (MENA)—An official military source today affirmed that no comment was made by a military source, as reported by foreign news agencies and newspapers, on an explosion in a brotherly Arab country.

The source affirmed that "Al-Ma'adi" Military Hospital did not receive any injured Egyptians or Arabs from any Arab country during the last month as reported by news agencies.

Foreign Minister Discusses Explosion

JN0809061089 Manama WAKH in Arabic
0530 GMT 8 Sep 89

[Text] Washington, 7 Sep (WAKH)—Nizar Hamdun, Iraqi Foreign Ministry under secretary, has denied British press reports of a large number of victims in an explosion that occurred recently in an Iraqi weapons factory.

The newspaper THE INDEPENDENT claimed that an explosion occurred in a military factory in southern Iraq on 17 August and resulted in the deaths of 700 people, including a number of Egyptian experts.

In a statement carried by the Voice of America, the Iraqi official explained that the incident resulted in the deaths of around 19 people only. He added that the incident is a normal, limited incident similar to other incidents that have taken place in many countries in the world.

He described the reports on this incident as inaccurate and very exaggerated.

Hamdun denied that his country has relations with any other country regarding manufacturing or developing missiles or weapons as mentioned in the reports. He said that Iraq relies on its own resources to develop and manufacture arms.

He also denied that those wounded or killed in the incident included any Egyptians.

ISRAEL**2d 'Spy' Satellite Reportedly Scheduled for Launch****DAILY TELEGRAPH on Israeli, Iraqi Plans**

PM0709160089 London THE DAILY TELEGRAPH in English 7 Sep 89 p 14

[Article by Anton La Guardia: "Israel Plans To Launch Second Spy Satellite"]

[Text] Israel is planning to launch a second spy satellite in the coming weeks, almost a year after launching Ofek 1. Western diplomats and defence sources said yesterday. It is believed that Ofek 2 will be sent into orbit from a testing ground on the Mediterranean coast south of Tel Aviv.

Ofek 1 remained in orbit until January, far longer than initially planned, and it is believed the new craft may stay in place for about two years.

The launch will be around the Sept 19 anniversary of that of Ofek 1, which was officially described as a scientific device designed to "study the earth's atmosphere and magnetic field". Israeli experts have said it could have military applications.

Israel eventually wants to develop a military reconnaissance satellite to spy on its Arab neighbours and free itself from its dependence on United States intelligence pictures.

Although Israel has never disclosed what vehicle was used to lift Ofek 1 into orbit, it was believed to be a specially adapted version of the Israeli-made Jericho ground-to-ground missile.

Meanwhile, an Egyptian military spokesman said yesterday that there had been an explosion at an Iraqi defence establishment "in the second half of August".

Western diplomats were still seeking confirmation last night of reports that the accident had destroyed part of a secret Iraqi missile factory at Al-Hillah, south of Baghdad, killing up to 700 people. Egyptian technicians were supposedly among the casualties, and the Maadi military hospital in Cairo was reportedly closed to civilian patients. But hospital officials yesterday denied the report.

According to some accounts, the accident destroyed only an Iraqi explosives factory. But Kurdish opposition sources maintain that the Al-Hillah plant was being used to develop the Badr-2000 medium-range missile, in conjunction with Egypt and Argentina.

They said it took Iraqi authorities, using fire-fighting aircraft, a week to bring the flames under control.

One Western arms control official said: "If the reports are true, it would be a spectacular failure for the Iraqis. It underlines the fact that it is very expensive in terms of resources and manpower for Third World countries to develop this kind of high-technology weapon."

The Argentine version of the missile is known as the Condor 2, and a group of seven Western countries taking part in the Missile Technology Control Regime have been trying to slow down the project.

The missile, which could be fitted with chemical warheads, is thought to have a range of about 550 miles, which would allow Argentina to reach the Falklands and Iraq to reach Israel.

However, the Condor 2/Badr 2000 project has been plagued by accuracy problems, partly as a result of Western restrictions on guidance technology.

Britain has been pressing the Soviet Union and China to cooperate with the West to check the spread of ballistic missiles, especially in the Middle East.

Arab missiles can already reach most parts of Israel, which is also trying to develop anti-missile defences.

Thousands of residents in central Israel saw a possible missile test over the Mediterranean last Sunday when they say an object streaked across the sky, leaving a bright trail.

There was no official announcement of a test.

Israeli Denial Reported

TA0809080689 Jerusalem THE JERUSALEM POST in English 8 Sep 89 p 16

[Report by David Horovitz and Judy Maltz]

[Excerpt] Israel Aircraft Industries yesterday rejected out-of-hand a British press report claiming it was about to launch a second satellite into space. "Ofek-2 is not included in our working programme this year, and no date has been set for its launching," a company spokeswoman said.

A report appearing in yesterday's DAILY TELEGRAPH said Israel was planning the imminent launch of a second satellite, almost a year after the successful launch of the Ofek-1. According to Western defence sources quoted by the newspaper, Ofek-2 will be sent into orbit within weeks. [passage omitted]

IDF Spokesman: IDF 'Knows Nothing' of Launch

TA1509053389 Jerusalem Domestic Service in Hebrew 0500 GMT 15 Sep 89

[Text] RAFAEL, Israel's Arms Development Authority, reports this morning that in the past year the Syrians have begun research and development into nuclear energy, microelectronics, and chemistry.

Our correspondent Karmela Menashe reports that according to the author of the article, Syria is investing great efforts in nuclear research. It is negotiating with Belgium and Switzerland on the building of a large nuclear energy reactor and with the USSR and Italy on nuclear research reactors. The article includes criticism of the Defense Ministry, which the author blames for neglecting research, development, and infrastructure.

The IDF [Israel Defense Forces] spokesman has responded to the USSR claim that Israel launched a long-range ballistic missile into the Mediterranean last night and said the IDF knows nothing about such an event.

[THE JERUSALEM POST in English on 15 September on page 1 carries a report by THE JERUSALEM POST staff and news agencies citing the TASS report and adding that "Jerusalem officials expressed ignorance of the Soviet report, and declined to make any comment about it. Both the prime minister's media adviser, Avi Pazner, and Foreign Ministry spokesman Yosef 'Amihud said 'they had no knowledge whatsoever about this matter'."]

Moscow claimed that the missile launched by Israel landed in the Mediterranean, 400 km north of Benghazi in Libya, a distance of 1,300 km, and was fired from a site near Jerusalem.

PAKISTAN

Negotiations Completed for French Nuclear Plant

BK1309053289 *Islamabad Overseas Service in Urdu*
0500 GMT 13 Sep 89

[Text] An agreement will soon be signed with France for the construction of a 900-megawatts nuclear power plant in Pakistan. Speaking at a luncheon in Karachi yesterday, Dr Munir Ahmed Khan, the chairman of Pakistan Atomic Energy Commission, said that negotiations in this connection have been completed and that France has expressed its willingness to assist Pakistan in implementing this much needed project. He also said that Pakistan is facing a power shortage, while its future progress and prosperity depend on its ability to end the shortage of electricity.

Paper Urges Nuclear Nonproliferation Meeting

BK1709054689 *Rawalpindi HAIDER in Urdu*
31 Aug 89 p 3

[Editorial: "Nuclear Nonproliferation"]

[Text] In an interview, the Pakistani prime minister, Ms Benazir Bhutto, has clarified that Pakistan has adequate nuclear expertise and know-how to face any kind of threat. However, Pakistan does not have any intention of utilizing them. The prime minister said: We have knowledge, but there is a difference between knowledge and capability. We do not have any intention of utilizing our knowledge in the absence of any threat. Our government has a strong determination to adhere to the policy of nonproliferation. Any unilateral action by any country of the subcontinent can trigger a nuclear arms race. The prime minister disclosed that Islamabad has taken steps to initiate a regional dialogue on this issue. But, India has some reservations in this regard. A dialogue of this sort will be a definite guarantee to eliminate the threat of nuclear proliferation in the subcontinent.

The Pakistani prime minister's thoughts on nonproliferation are evidence of Pakistan's strict adherence to the policy of noninterference in the internal affairs of others and its desire to keep the subcontinent absolutely free from a nuclear arms race. All of the countries of this region should allocate a major part of their resources for the welfare of their people and steps should be taken to establish lasting peace in the region. Nevertheless, all of these objectives cannot be realized only by Pakistan's unilateral policies and tendencies. Therefore, all countries of the region should certainly keep these objectives in view and make arrangements for a regional-level dialogue to realize them. All countries of the region should reach a consensus for some accord on nuclear

nonproliferation. Until this kind of accord comes into effect in the region, there will be concern as always.

While reviewing the political situation of the subcontinent, we come across the fact that the major impediment in the way of achieving nuclear nonproliferation is India's attitude. India, which had its first nuclear explosion in 1974 is now in a position to have another one. During this time, it has acquired an extraordinary nuclear capability and has also started manufacturing sophisticated weapons. Moreover, it has acquired sophisticated weapons from the Soviet Union. The question arises—after all, India's security is threatened by which country in the region—why does it accumulate weapons and why does it want to trigger an arms race in the region thereby? India's negative tendency has not only caused concern among the countries of the region but has also led to a bleak future for peace.

Taking India's military preparations and its atomic capabilities into consideration, one can understand that it is not only a threat to Pakistan but is also a cause for concern and threat to the security of other countries of the region. All countries of the region should make concerted efforts toward nuclear nonproliferation. Although Prime Minister Benazir Bhutto has mentioned India's hesitation about a dialogue on nuclear nonproliferation, it does not mean that Pakistan should give up its efforts in this regard. In our opinion, these efforts should continue and Pakistan should liaise with other countries of the region and arrange for a regional conference on ending the arms race and on nuclear nonproliferation. This sort of conference will produce positive effects in the region and Pakistan's efforts for nuclear nonproliferation will definitely prove effective.

Editorial Urges Pakistan To Become Nuclear Power

BK1509140589 *Karachi NAWA-I-WAQT in Urdu*
31 Aug 89 p 10

[Editorial: "Nuclear Policy—No Need for Any Fear or Hesitation"]

[Text] In an interview to AFP, Prime Minister Benazir Bhutto has said that Pakistan has the nuclear know-how to meet any threat, but, in her opinion, there is a great difference between nuclear know-how and nuclear capability. The prime minister's remarks here are slightly different from her earlier stand and the categorical statement she made during her tour of the United States that "we neither have any nuclear bomb nor will we make one." Now coming closer to national aspirations, the prime minister has at least made an encouraging declaration that Pakistan might make use of the nuclear know-how in the event of any threat. In this way, Pakistan's new elected government has given up its earlier hesitation and given an indication of keeping the nuclear option open. For any Pakistani government or any party desiring to form a government, talking openly about the country's nuclear policy is nothing short of a

difficult test. If it does so under natural compulsions, it becomes unpopular at home; and if it openly talks about the nuclear policy that is in keeping with national aspirations, it invites the wrath and anger of the influential world powers.

Everyone knows that the United States, Europe, the Soviet Union, the Hindus, and the Jews would not like to see Pakistan become a nuclear power, mainly because Pakistan is an Islamic state. In fact, the world nuclear club has no objection to the nuclear activities of India, South Africa, and Israel, but at the very suspicion of any nuclear research activity in Pakistan, Iraq, and Libya, the entire world raises a hue and cry and starts complaining about the "Islamic Bomb." Iraq's desire for an atom bomb has been shattered by Israel, so then it was only Pakistan which could make any headway in the nuclear field. Therefore, to block the way, a propaganda campaign was launched on the one hand and on the other, Israeli and Indian forces were persuaded to launch a joint preemptive strike at Pakistan's nuclear center. In addition to this, the United States and the international financial institutions stopped providing loans and aid to Pakistan to meet its legitimate economic and defense requirements. In short, they left no stone unturned in restraining Pakistan. But, in spite of this hostile opposition, it was impossible for Pakistan to retreat from the path of nuclear research, because its neighboring and eternal adversary, India which, according to Prime Minister Benazir Bhutto's remarks in the aforementioned interview, has "invaded Pakistan thrice," had made public its ambitions by conducting a nuclear explosion in 1974.

India's war machinery is no less effective than that of any superpower. Its Navy is equipped with nuclear submarines and its Air Force with missiles like Agni, Akash, Prithvi, Trishul, and Nag. The Agni missile, whose striking range is 2,500 miles, is capable of carrying even nuclear weapons to targets. According to latest press reports, India is to test fire a new missile. With such a huge stockpile of arms in its arsenal, India is desiring to become not merely a regional hegemonistic power but also a superpower at the international level, because the Nehru family is specifically trying to turn India into a "Hindu Ashoka Kingdom" to perpetuate its personal family rule. It is a historical fact that whenever this family has faced opposition within the country, it has invaded a neighboring country to distract its people's attention from the main problem.

It is also election time in India, and Prime Minister Rajiv Gandhi is unpopular throughout the country because of his immature policies. The Indian opposition parties have called a nationwide general strike to force Rajiv Gandhi to resign, and it is feared that following in the footsteps of his mother, Rajiv Gandhi might also stir a war between India and Pakistan to escape defeat in the general elections. He has already enforced a blockade of Nepal and maintains troops in Sri Lanka and the Maldives. All these measures are intended to prove to the Indian voters that Rajiv Gandhi is a bold and courageous person.

To meet this situation, the Pakistani leadership should also give proof of its extraordinary courage and boldness. Pakistan cannot meet these threats only with the help of conventional weapons which it can ill afford to acquire and, hence, the situation and also the wisdom demand that Islamabad should continue its progress in the nuclear field as a deterrent. It is not necessary to display one's insanity by using such a weapon. So far, this foolish step has been taken only by the United States which raises objections to [nuclear programs of] others while its own hands are stained with the blood it spilled at Hiroshima and Nagasaki. After Hiroshima and Nagasaki, the United States has had no courage to use a nuclear weapon simply because now the United States is not the only nuclear power. In accordance with this principle, the only befitting reply to the Indian demon's nuclear threat is that Pakistan should also become a nuclear power on a par with India, because the secret of Pakistan's effective and credible defense lies in this principle.

Senate Informed of Nuclear Power Plans

BK2109083789 Islamabad Overseas Service in English
0800 GMT 21 Sep 89

[Text] The Senate was informed today that capability is being developed to design, manufacture, and construct nuclear power plants in the country to meet the growing needs of electricity. The minister of state for parliamentary affairs, Dr Sher Afghan, told the house during question hour that efforts are also being made to acquire nuclear power plants from abroad. The French Government has shown interest in supply of the plant under International Atomic Energy Agency safeguards without insisting that Pakistan should sign the Nuclear Proliferation Treaty [as heard]. The acceptance of this offer is linked with the resolution of the outstanding issues of the reprocessing plant (?problem).

The minister of state for finance, Mr Ehsanul Haq Piracha, told the house that the government of the Pakistan People's Party (PPP) is fully conscious of its responsibility for acquisition of nuclear technology to bridge the growing gap between demand and production of power. The previous PPP government had signed an agreement with France and immediately after assumption of office by the present government, it took up the matter again with that country. The issue was discussed during prime minister's visit to France and will be pursued when the French president visits Pakistan in near future.

Commentary Views Peaceful Use of Nuclear Energy

51004711b Karachi DAWN in English 20 Aug 89 p 7

[Text] The Government has approved a five-year plan for the development of engineering capability for the indigenous manufacture of nuclear reactors. The step is in keeping with the country's firm commitment to the peaceful uses of nuclear energy and indicates the Government's determination to exercise all possible options to promote nuclear technology to overcome the crippling

energy crisis. Utilising this option for scientific, industrial and economic development was and continues to be the main objective of Pakistan's nuclear programme. Considering the magnitude of the nation's future energy needs, there can be little doubt that nuclear energy provides the answer if the country is to face the challenges of the twenty-first century. At present, Pakistan's oil import bill is worth over a billion dollars in foreign exchange. Given the projected shortfall of 8,000 megawatts on the national grid by the turn of the century, the yawning gap between demand and supply will be difficult to bridge without nuclear energy meeting a large part of the demand build-up. Germane to the pursuit of the nuclear option is the recognition of the long-term cost effectiveness of atomic energy. The reliability of nuclear power in meeting pressing energy and economic needs can be gauged from the fact that till last year, 417 nuclear reactors were operating in 26 countries with a total generating capacity of 298,000 MW. In other words, nuclear power was contributing nearly 16 per cent of the total energy generation in the world.

The Pakistan Government, cognisant of the national energy requirements and the use of nuclear technology for power production, has been utilising atomic energy for purposes of expanding basic research and technological development programmes to boost the country's economy. It has already made good progress in the development of nuclear technology in agriculture. NIAB-78, for example, is the most popular and high-yielding cotton variety, contributing 5.95 million bales to the total cotton production of 8.5 million bales. It is making good use of nuclear technology for cancer treatment in nine regional centres. Pakistan's efforts to manufacture nuclear power plants through indigenous means as well as with international cooperation are, therefore, of a piece with its policy to promote the peaceful uses of nuclear energy in various fields.

But more significant than this unwavering adherence to these laudable objectives has been Pakistan's commitment not to use nuclear technology for military purposes. Although doubts have at times been expressed about the peaceful nature of its nuclear programme, by and large a healthy change in the attitude of many States towards Pakistan has been visible of late. In the recent past, Pakistan has been accepted as a member of two significant organisations concerned with information relating to operating experience and supply of nuclear power plants. The World Association of Nuclear Operators comprises all major nuclear energy utilities in more than 25 countries. Pakistan is also a member of the Canadian Deuterium Uranium Owners Group, including countries which own and operate Candu-type reactors. Similarly, some countries, which had earlier looked upon Pakistan's nuclear programme with suspicion, have begun to appreciate the primacy of this country's nuclear power needs. France, for example, has realised Pakistan's difficulties in this regard and has expressed its readiness to help resolve them. Also, President Bush has accepted assurances from Prime Minister Benazir Bhutto that her

country is not engaged in developing nuclear weapons. The continuation of the aid package and the recent approval of Pakistan's request for 60 F-16 aircraft make it likely that President Bush will be able to make the annual certification that this country does not possess a nuclear device. The approval, thus, of the five-year plan to make nuclear reactors within the country represents a positive development not only in the context of efforts to overcome chronic energy shortages, but also for ensuring the application of nuclear energy to peaceful uses.

Nuclear Reactor Construction Plan Approved

51004711a Karachi DAWN in English 17 Aug 89 p 1

[Text] Lahore, Aug 16—The Government has approved a five-year plan for designing and development of engineering capability to make nuclear reactors within the country.

This was disclosed by Mr Munir Ahmed Khan, Chairman, Pakistan Atomic Energy Commission, at a Press briefing here on Wednesday afternoon.

The prevailing energy crisis, negative international attitude to provide nuclear technology to Pakistan, positive change in France's attitude after Paris visit of Prime Minister Benazir, KANUPP incident and PAEC's contribution in combating cancer, were the other important subjects he covered at the briefing.

Mr Munir Ahmed Khan said Pakistan was exercising all possible options to promote nuclear technology to overcome the energy crisis, which, at present, was consuming about one billion dollars of foreign exchange in the form of oil imports. With Pakistan continuing to pursue a logical nuclear policy, instead of resorting to "belligerency or showing of fists," the situation would hopefully change in its favour. After Prime Minister's visit to Paris, France's attitude appeared to be more flexible and positive and by the time the French President Francois Mitterrand visits Pakistan by the end of the current year or early next year, the bilateral talks between the two countries on the supply of a nuclear power reactor to Pakistan would witness a positive development, he emphasised.

He said Pakistan was also considering other options, but declined to identify the countries with which Pakistan was in contact in connection with the nuclear technology, because in that case the countries opposed to Pakistan attaining nuclear technology, might once again start pressurising the possible supplier countries.

Head of the PAEC for the last 17 years, Mr Khan said the democratic government was fully cognizant with the energy requirement of the country and was all for the use of nuclear technology for power production, to bridge the yawning gap between the demand and availability of energy.

HEAVY WATER: About the leakage of heavy water from the Karachi Nuclear Power Plant (KANUPP) a few months ago, the PAEC Chairman said the specialists of

the International Atomic Energy Agency (IAEA) had described it as a "nuclear incident" and not an accident. The leakage was caused by the failure of a gasket in a valve. A total of 35 tons of heavy water was collected but still a small quantity evaporated 80 per cent of the collected water had been upgraded and purified and put back in the reactor, he added.

According to him, the loss was not much even in financial terms.

As for radioactivity, caused by the KANUPP incident, Mr Munir Ahmed Khan said there was no such danger and nobody received a radiation dose. Radiation released in the air was less than 6 per cent of the annual allowable release, he claimed. Even the total radioactive released by the KANUPP during all the 17 years of its functioning was less than one tenth of the allowable quantity, he added.

He said IAEA experts would be visiting this plant next month to see for themselves the safety measures before it resumed functioning.

WASTE FUEL: Khan claimed that the KANUPP operated better and more safely than reactors in other countries, including a neighbouring state.

The PAEC chief told a questioner that at present the Commission was storing all the waste fuel discharged by the KANUPP and it would be treated when Pakistan had a reprocessing plant.

He said with Pakistan having succeeded in running the KANUPP despite embargo by Canada on the supply of heavy water and spares for this lone nuclear power station in the country, there was visible change in the attitude of Canada and other countries towards Pakistan. Now Pakistan had also become a member of the World Association of Nuclear Operators.

The PAEC was operating nine nuclear medical centres at present and a new one was in the process of establishment at Abbottabad.

In total, these medical centres provided medical treatment to over 160,000 patients every year.

He acknowledged that India was ahead of Pakistan in the nuclear field. India's education system was the major reason for its advancement and Pakistan would not be able to face the 21st century, without effecting serious changes in its education system, he remarked.

Scientists To Assess Nuclear Plant Damage

BK1309045889 Islamabad Domestic Service in Urdu
0200 GMT 13 Sep 89

[Text] Pakistan Atomic Energy Commission Chairman Dr Munir Ahmed Khan has said the present elected democratic government has approved a comprehensive and systematic power generation plan under its socio-economic development program, whose early implementation is being given priority over everything else. Speaking at a luncheon in Karachi yesterday, he said Pakistan is facing a power shortage, while its future progress and prosperity depend on its ability to end the shortage of electricity.

He told newsmen that a high-powered scientists' delegation will visit Pakistan next week to assess the damage caused to the Karachi Nuclear Power Plant by the leakage of heavy water there recently. After a detailed inspection of the power plant, the team representing the International Energy Commission [as heard] will give the green light for the recommissioning of the plant which was closed after the heavy water leakage.

SYRIA

Nuclear Research Centers Being Constructed

51004503: Tel Aviv 'AL HAMISHMAR in Hebrew
15 Sep 89 p 1

[Text] Avi Benayahu quotes an article appearing in the journal issued by the research staff of the Israeli Rafa'el Armament Development Authority: "The Syrians have, during the last year, entered the field of research and development of microelectronics, chemistry, and nuclear energy and have established institutions such as the Center for Nuclear Energy and Research." The journal reveals that Syria is investing significant efforts in the field of nuclear research and development and that it is negotiating with Belgium and Switzerland regarding the planning and building of Syria's first atomic energy reactor. The intention is to build six atomic reactors in order to produce electricity at an investment of about \$3.5 billion. The Syrians are also endeavoring to build nuclear research reactors with Russian and Italian assistance and that they have recently begun searching for sites for the reactors. According to the article, elements in Israel who closely follow developments in Arab and hostile countries, are greatly troubled by this process of rapid change. Scientific publications written by Arab scientists point to a surprising leap forward in quality as well. A senior scientist of the defense establishment is quoted in the article as saying that "should there be no change, and should the erosion in budgets and in the status of research and development and of higher education continue, a tangible danger to our scientific-technological supremacy over the Arab states exists."

Defense Ministry Notes Israeli Missile Test*LD1409192789 Moscow TASS in English
1917 GMT 14 Sep 89*

[Text] The Soviet Defence Ministry informs that according to data at its disposal, a ballistic missile with a range of 1300 km was launched today from the area around Jerusalem.

The missile hit the ground [as received] in an area 400 km north of Benghazi.

An analogous start of a ballistic missile took place in Israel in January 1989.

Reported Israeli Missile Launch Draws Reactions*TA1709175089 Moscow Radio Peace and Progress in
Hebrew 1500 GMT 17 Sep 89*

[Aleksandr Kushnir commentary—read by announcer]

[Text] TASS has reported that according to the Soviet Defense Ministry, Israel last Thursday launched a ballistic missile with a range of 1,300 km. The missile was launched from the Jerusalem area and landed in the Mediterranean 400 km north of Benghazi, Libya. TASS said Israel launched a similar missile in January 1988. The Israeli Army command's spokesman, on the other hand, reported that he had no information about such a launch.

The AP news agency recalls in this context that since the mid-1980's the media have frequently reported Israel's development of missiles capable of carrying nuclear warheads.

We would like to remind our listeners that 2 years ago, in the summer of 1987, Israel tested a Jericho-2 missile. Our radio station then broadcast a commentary pointing to the danger to Israel from the launching of a missile capable of carrying nuclear arms. We pointed out, for instance, that such missiles are capable of reaching Soviet territory, and that our country could not turn a deaf ear to that.

The commentary drew the attention of Israeli media. Following the controversy, Shim'on Peres, who was then foreign minister, found it necessary to issue an announcement saying that Israel poses no threat to our country. He also declared that Israel favors transforming the Mediterranean's eastern basin into an area demilitarized of weapons of mass destruction.

This announcement, as Soviet Foreign Ministry representatives pointed out at the time, was received with satisfaction in our country. We believe now, just as we did then, that not being a large country but with a dense population, Israel must avoid a nuclear arms race, since the outbreak of a nuclear conflict in the Middle East could bring a holocaust. Now, there is the latest report that Israel has launched a ballistic missile. Our radio station does not take responsibility for determining which report is correct, that of the Soviet Defense Ministry on the missile launch, or of

Israel's Defense Ministry, which said it had no information about it. But it is a fact, and there is much evidence to show, that in its level of militarization, Israel takes first place in the world. In other words, per capita military expenditures in Israel are the highest anywhere. It is also a fact that Israel's strategic ally has coopted it into the century's biggest arms program, the Strategic Defense Initiative, known as "Star Wars."

The above cannot but arouse a lack of confidence in Israel among the publics of various countries, including the Soviet public. We would not, of course, wish to teach Israel what is good for it and what is bad, but we agree with the positions of those in Israel who believe its continued armament, especially the development of its nuclear missile potential, constitutes a mortal threat to Israel and to the countries in the Middle East in general. It is obvious that to deliver the Middle East from the growing violence and tension, progressive forces in Israel, which point to the defects of militarization, also demand an end to the ruling circles' policy of occupation. It should be admitted that to achieve peace with the Arabs, Israel does not need an arms race; even more so it does not need to convert it into a nuclear missile problem.

During Israel's 41-year history weapons have not brought it peace or security, and we would like to believe that the report on the launch of the ballistic missile is a mistake.

International Research Center at Chernobyl Planned*LD1509085189 Moscow TASS in English
0840 GMT 15 Sep 89*

[Text] An international research centre to be established at the Chernobyl nuclear power station will help strengthen cooperation between various countries in ensuring safety of nuclear power plants. Representatives of the International Atomic Energy Agency (IAEA) and Soviet specialists discussed relevant questions in Moscow this week.

Aleksandr Protsenko, chairman of the USSR State Committee for the Use of Atomic Energy, told TASS that IAEA plans to draft a package of programmes for future investigations and to send them to interested states wishing to participate in the joint work.

The Chernobyl plant has now the latest equipment and advanced technology to make the plant's work safe and reliable, Protsenko noted. He said that the USSR conducts work to raise safety at nuclear plants in two main directions. Firstly, higher skills and greater responsibility of personnel. Secondly, better designs of reactors, including means for an emergency shut-down. For instance the Chernobyl plant uses now a system of introduction of absorption rods which stop chain reaction in a much shorter time than it was provided for by the old design of the reactor used at the plant before the disaster.

Protsenko said that scientists from various countries can also study the influence of radiation on the environment over many years in the zone of the Chernobyl nuclear station.

Chernobyl Commission Holds Session

*LD1609184989 Moscow Television Service in Russian
1430 GMT 16 Sep 89*

[From the "Vremya" newscast]

[Text] A session of the government commission on eliminating the consequences of the accident at Chernobyl nuclear electric power station [AES] has been held in Bryansk.

[A. Guglya] [Video shows commission members looking around villages and talking to populace.] The six southwestern rayons of Bryansk Oblast turned out to have been subject to radioactive contamination as a result of the accident at the Chernobyl AES. In figures, the picture looks like this: 300,000 people living on the territory of 260,000 hectares. The members of the government commission on eliminating the consequences of the accident at Chernobyl AES, led by Comrade Doguzhiyev, deputy chairman of the USSR Council of Ministers, were briefed on the progress of decontamination work in the settlements in the contaminated rayons, visited collective and state farms and social and cultural amenities, and examined the way trading, medical, and consumer services to the population are being organized.

It was originally planned to evacuate 11 settlements in the third contamination zone. After the radioactivity situation had been more precisely assessed, however, on the basis of an analysis of decontamination work, another 20 villages and hamlets were added to this list—13 of them because of the radioactivity factor, and 7 on social grounds.

Adoption of the decision to evacuate these settlements was held up due to assessments of the radioactivity situation that were sometimes ambiguous, and due to lack of coordination between the recommendations of scientific research institutions and individual scientists. Other rayons in the oblast, such as Zhiryatinskiy, Sevskiy, and Zhukovskiy rayons are ready to receive the migrants, help them build houses, and fix them up with jobs. In a word, they will not leave their neighbors in misfortune.

In the near future the commission will submit to the government and the Supreme Soviet specific proposals on the program for further eliminating the consequences

of radioactive contamination of the southwestern rayons of Bryansk Oblast. The program should take into account the blunders and unsystematic actions perpetrated during the first stages of this important task.

Construction of Nuclear Power Plant Opposed

*LD1209040289 Moscow Television Service in Russian
1430 GMT 11 Sep 89*

[From the "Vremya" newscast]

[Excerpts] The Crimean Nuclear Electric Power Station [AES]: To be or not to be? This is the topic of our next report.

[Begin recording] [Correspondent V. Plotnikov—identified by screen caption] The station and a settlement for atomic power engineers are being built in a zone of seismic force nine and a strong tectonic activity. Nature has already sent grim signals. You can see how houses are crumbling and even a single-storey post office is in a deplorable state; it is held together by steel clamps. [video shows building with cracked walls]

What awaits the station, which is an immeasurably complex and large-scale structure? Members of a special commission of the USSR Council of Ministers have confirmed the worst forecasts of those opposing the AES. [video shows rally with banners reading: "Picketing the Crimean AES for the 35th day," "No to the Crimean AES," "We hope the CPSU will not permit commissioning of an AES in the Crimea!!!"] [passage omitted: angry residents voice their fears about the AES].

There still is no decision on the results of the work of the governmental commission, although it was due long ago. This, too, makes people worried and uneasy. At the same time, a specialist in alternative power sources spoke at the rally. Data was given showing that the use of wind alone can provide more power than the AES, and the Crimea is rich in solar heat, seawater heat, and geothermal springs. A session of the oblast soviet of people's deputies has come out against the AES. Its decision was supported by the Ukrainian Government. Nevertheless, an atomic reactor already has been delivered to the construction site. [video shows more shots of the rally] [end recording]

In addition to this report, here is what our correspondent reports: Last Sunday, a large-scale action by those opposing the construction of the AES took place in the Crimea. A many-thousand strong picket extended from Semfiropol to Kerch.

CANADA

Pickering Station Safety Criticism, Radiation Accident**AECB on Safety Faults**

51200029 Toronto *THE GLOBE AND MAIL* in English 8 Aug 89 p A3

[Article by Margaret Polanyi]

[Text] Ottawa's nuclear regulatory body has criticized the Pickering Nuclear Generating Station for failing to keep its house in order.

The Atomic Energy Control Board's 1988 report points to deficiencies in housekeeping, conventional safety and radiation protection at the station east of Metro Toronto.

It says "poor housekeeping" was a contributing factor in a small fire inside the reactor building last summer.

The report identifies five areas of concern:

- Fire extinguishers had unacceptably low pressure for extended periods of time.
- Fire doors, required to be kept closed, were blocked open on occasions.
- Compressed gas bottles were not always properly secured.
- Signs warning of radiological hazards were frequently filled out improperly.
- Instruments for monitoring radiological contamination were often defective in some areas.

"The individual deficiencies observed may well have had only a minor impact on the safe operation of the station," the report said.

But it said the number of deficiencies showed inadequate field supervision and inspection by station supervisors and management.

"We're saying the housekeeping isn't good," Zygmund Domaratzki, director-general of the AECB, said yesterday.

He said the chief housekeeping concern was over signs improperly filled out on radioactive material.

"It's not good enough to say: 'But people know the hazard is there,'" Mr Domaratzki said in a telephone interview from Ottawa. He said proper posting is required by law.

Elgin Horton, a spokesman for Ontario Hydro, which operates the Pickering nuclear station, played down the AECB's housekeeping concerns.

Mr Horton, director of the nuclear generation division, said maintenance work at the plant is playing havoc with housekeeping. (A \$51-million modifications program is under way.)

But there is no safety threat, Mr Horton said in an interview yesterday.

The concerns are being reviewed by staff and will be addressed, he said, but not with dramatic actions.

The AECB also draws attention to violations of operating licence conditions and regulatory requirements at Pickering.

Rules were broken last August when a heavy-water spill in a reactor auxiliary bay caused airborne tritium, a radioactive element, to spread to the administration building cafeteria.

Radiation Accident

51200029 Toronto *THE SATURDAY STAR* in English 12 Aug 89 p A17

[Article by Daniel Girard, TORONTO STAR]

[Text] Management error led to an accident at the Pickering plant that exposed a worker to the highest radiation level ever recorded in a Canadian nuclear facility, union officials say.

An Ontario Hydro investigation into Wednesday night's accident concluded that workers removing radioactive fuel rods from one of the plant's reactors used a non-protective practice ring instead of the lead-lined one which prevents radiation leaks.

But workers were advised to use the ring by their supervisor, said John Murphy, vice-president of Local 1000 of the Canadian Union of Public Employees, which represents them.

It was the first time the rods had been changed since the reactor was remodelled in 1987, Ontario Hydro spokesman Jack Muir said.

When the old protective ring did not fit the new reactor, workers called a supervisor who accidentally told them to use the ring designed for non-radioactive work, Murphy said.

The rings look identical except the practice ring weighs 770 kilograms (1,700 pounds) and the lead-lined one weighs 4,300 kilograms (9,500 pounds), he said.

Chromosomal Testing

One man was exposed to 12.4 rems and another to 5.6 rems. The Atomic Energy Control Board allows an annual full-body radiation exposure of 5 rems, the unit for measuring the harm caused by radiation on human tissue.

Ontario Hydro has an annual limit of 2 rems, Muir said.

The 12.4-rem dose is the equivalent of 2,500 chest x-rays, said Norm Rubin, director of nuclear research with Energy probe, a nuclear watchdog.

The utility is investigating the chain of events leading up to the accident, but doesn't expect to lay the blame on any one person, Muir said.

The union doesn't want a witch hunt, but Hydro must accept responsibility, Murphy said.

Workers should be given chromosomal testing, which more accurately determines the extent of radiation damage, and the company should file for workers' compensation on their behalf for possible future claims, he said.

The testing has been done but the compensation claim is "not appropriate in this case" because the workers sustained no visible injury, Muir said.

But the worker who received the higher dose of radiation has a 25-times greater chance of death than anyone else doing industrial work, Rubin said.

After their regular days off, the two workers will resume non-radioactive work at the plant, Muir said.

Ontario Decision To Sell Tritium Sparks Controversy

Criticism of Plan

51200030 Ottawa *THE OTTAWA CITIZEN in English* 1 Sep 89 p C16

[Text] Toronto (CP)—The amount of radioactive tritium from Ontario's nuclear reactors to be sold in the United States is too small to affect that country's production of nuclear weapons, a spokesman for Ontario Hydro says.

Don Anderson said the utility has been given approval to sell the radioactive gas to only one U.S. firm—a Boston pharmaceutical company.

No other sales south of the border will be considered, he said.

"I suspect the Americans are going to be a little unhappy with that but that's the way it is," Anderson said today.

The Ontario government announced Wednesday it would allow the export of tritium for use in fusion and medical research under a strict set of guidelines it says will prevent its use in nuclear weapons.

Tritium, a glow-in-the-dark by-product of Candu reactors, is essential in the production of hydrogen bombs and fusion research. It has also been used for illuminating watches, exit signs, remote runways as well as a variety of medical research, including AIDS and cancer treatment where it is used as an internal tracer to track the effect of the disease in the body.

Anderson said Ontario Hydro can only sell tritium in Japan, Germany, Italy and Britain—all signatories to the Nuclear Non-Proliferation Treaty.

The government is restricting the supply of tritium for use in lighting systems on Ontario in the hopes of developing a new industry. Hydro will consider selling tritium to other provinces who want to develop commercial uses, Anderson said.

"Up until now, research has been constrained by uncertainty and concern over the erratic supply of tritium," Anderson said.

Critics of the plan say it would ease the worldwide shortage of tritium and indirectly contribute to weapons production.

"As long as people are making bombs, we should not be exporting tritium," said Derek Paul, a University of Toronto physicist.

If Canada helps supply tritium for medical, fusion and energy research, the U.S. military can keep more of its own scarce supplies for bombs, Paul said. Nuclear weapons need to be retopped with tritium occasionally because the substance decays.

"It helps relieve an overall shortage, you've inadvertently helped the arms race."

The only plant in Canada capable of refining tritium is a \$145-million facility which extracts it from heavy water at the Darlington nuclear station, east of Toronto.

One thousand times more valuable than gold, tritium is expected to net Hydro \$6 million over the first three years and up to \$100 million by 2000.

A spokesman for the union representing 1,800 Hydro workers also says it is opposed to the sale of tritium.

"Even if (tritium is) not sold directly for nuclear weapons, it frees up other tritium in the States to be used for nuclear weapons and fuels the arms race," said John Murphy, a Canada Union of Public Employees vice-president.

GLOBE AND MAIL Approval

51200030 Toronto *THE GLOBE AND MAIL in English* 1 Sep 89 p A6

[Text] After weighing the pros and cons, the Ontario government has made the right decision in allowing Ontario Hydro to sell tritium, a radioactive isotope found in the heavy water used at the utility's nuclear generating stations.

By the mid-1990s, using heavy water from its three major stations, Ontario Hydro will produce approximately 2.5 kilograms of tritium each year at an extraction plant at its new Darlington generating station. That volume far exceeds current world demand. Last year, for instance, only 335 grams of tritium were used around the world. About 300 grams went into self-luminous lighting, 20 grams to fusion research and 15 grams to pharmaceutical companies for use in research into

cancer and AIDS. The utility estimates that, by the turn of the century, tritium sales may bring it \$100-million a year in revenue.

Selling tritium was not an easy decision for the province to make. Although the federal government approved tritium exports under the terms of the nuclear non-proliferation treaty in March, 1986, Ontario spent another three years agonizing over the decision.

The reasons are obvious. By itself, tritium is far from the most dangerous of radioactive isotopes. Its main virtue is that it will glow in the dark for about 20 years. It is ideal for use in lighting airport runways, aircraft instrument panels and exit signs in buildings, since tritium-powered lights and signs do not require additional power sources.

But tritium is also an essential element of nuclear weapons. Environmental, disarmament and peace groups have raised a storm of protest every time the idea has surfaced of selling tritium, particularly to the United States.

Their concern has taken on more significance in recent months with the closing of the Savannah River plant in South Carolina, the only source of tritium in the United States. Even though the superpowers are currently reducing their stockpiles of weapons, continuing supplies of tritium are required just to maintain existing nuclear weapons, as the isotope decays fairly quickly.

Those opposed to the sale of Canadian tritium argue that, even with restrictions on its use, the simple fact that more tritium will be on the market means that more of it in the United States may be diverted to nuclear weapons. Still, the decision announced this week by Ontario Energy Minister Lyn McLeod has welcome safeguards to ensure that tritium does not end up in weapons.

All sales will be made public, with buyers outside the country limited to a select number of pharmaceutical companies and fusion energy projects. Such projects must not be linked in any way with nuclear weapons research or production, and must be run by governments that have signed the nuclear non-proliferation treaty. Projects in England, West Germany, Italy and Japan, but not the United States, currently meet those terms and will need tritium by the mid-1990s.

The bulk of the tritium sold by Ontario Hydro will not leave the province. It will be used primarily in a new joint venture between the utility and the private sector to create an Ontario-based radioluminescent tube manufacturing industry and to develop new uses for the isotope.

Ontario's guidelines are a sensible approach to the issue and address the concerns raised by opponents of the scheme. A valuable commodity may be sold under tight controls to ensure that it is not used for military purposes. At the same time, Ontario stands to gain the additional benefit of a new industry with major potential for international sales as a spin-off from its well-developed nuclear generating system.

FEDERAL REPUBLIC OF GERMANY

USSR To Cooperate in Nuclear Reactor Control

AU0609192689 Hamburg *DIE WELT* in German
6 Sep 89 p 15

["ews." report: "Russians Visiting TUEV"]

[Text] Dusseldorf—Since Chernobyl, there has been a rapidly increasing awareness for the environment and the dangers posed by inadequate safety precautions in major technological complexes. "As a consequence of the serious accident, we have become very sensitive to the condition of things in addition to nuclear energy," Vadim Malyshev, chairman of the newly created state committee for the control of security in industry and the nuclear energy sector. He has come to the FRG to gather information about the concept for the control of technological installations, and he held discussions with Environment Minister Klaus Toepfer, the chairman of the Rhineland-Westphalian TUEV [Technical Control Association, an authorized agency for compulsory inspection of motor vehicles and industrial plants and equipment], in Essen, as well as with representatives of the Trade Inspection Office, and of the mining and chemical industry. Malyshev said that, concerning this question, the state committee wants to promote international cooperation with a number of highly developed countries.

Malyshev went on to say that it is "understandable" that the population of the USSR has become "concerned" since the accident in Chernobyl, which was made possible not only by six very severe mistakes and the immense lack of discipline among the personnel, but also by mistakes in reactor design. Because the USSR believes that it has a "worldwide responsibility" for the operation of nuclear power plants, preliminary steps have been initiated to modernize the first generation of power plants. Next year, the State Committee will examine this program, and he does not exclude the possibility that some reactors will have to be temporarily closed down, Malyshev said.

Nuclear Cooperation With Brazil Monitored

AU0809114389 Frankfurt/Main *FRANKFURTER ALLGEMEINE* in German 8 Sep 89 p 6

["K.B." report: "Nuclear Deliveries Are Being Checked"]

[Text] Bonn, 7 September—The FRG Government has given assurances that cooperation between the FRG and Brazil in nuclear technology will remain under strictest international control. The reorganization of the Brazilian nuclear program mainly affects joint decision-making and control organs at the top, in which the Brazilian parliament is also represented. From the operational point of view, Brazil's autonomous program and nuclear cooperation with the FRG remain separated. This was the FRG Government's answer to an inquiry by

the Greens. Like the Social Democratic Party of Germany, the Greens' Bundestag group points out that the Brazilian Government has united the civilian and military nuclear programs. Therefore, there is the well-founded suspicion that FRG nuclear technology might be abused and the Nonproliferation Treaty might be violated. The FRG Government answers that the restructuring of the nuclear program is an internal affair of Brazil. This does not touch upon Brazil's obligations under international law and the rights of the IAEA to check on FRG-Brazilian cooperation in the peaceful use of nuclear energy. Cooperation between the Karlsruhe Nuclear Research Center and the Brazilian Nuclebras Organization is also under international control. The FRG Government confirms that at the beginning of 1988 the Karlsruhe Nuclear Research Center was granted a permit to export one facility. The permit was granted by the Economics Ministry, the Foreign Ministry, and the Research Ministry. This permit has been extended as of the beginning of this year. It involves a cycle apparatus, which is not used for the enrichment of uranium but only for test programs. The Greens, however, speak of a uranium enrichment facility.

FRANCE

Faroux Denies Helping Iraq Rebuild Reactor

TA1409112189 Tel Aviv 'AL HAMISHMAR in Hebrew
14 Sep 89 p 13

[Report from Paris by Arnon Yafe]

[Text] Roger Fauroux, French minister of industry and land management, told Energy and Infrastructure Minister Moshe Shahal yesterday that France is not rehabilitating the Iraqi nuclear reactor and that there are no plans to rebuild it. The supply of nuclear power plants to Israel is likewise not on the agenda, nor will it be a topical issue for at least another 15 years, when France becomes less dependent on Arab oil.

Shahal, who was received by Fauroux immediately upon his arrival in Paris, presented his host with plans for cooperation in the field of solar energy and discussed plans to reduce unemployment.

Drought Hampers Nuclear Plant Operation

51002435 Paris LE QUOTIDIEN DE PARIS in French
15 Aug 89 p 24

[Article: "Rhône Nuclear Power Plants Are Very Hot"]

[Text] We have been informed by an EDF [French Electric Co.] source that operations at the nuclear power plants whose reactors are cooled in the Rhône were voluntarily reduced by from 5 to 15 percent early this summer because of the drought and that the EDF has had to resort to coal-burning plants to cope with electricity consumption. The nuclear power plants were slowed down for 3 weeks in July and the Superphenix plant continued to operate at

reduced capacity in August to avoid excessive heating of the Rhône, whose level is very low.

Furthermore, the EDF usually takes advantage of the drop in power consumption in summer to conduct maintenance and inspection operations on its nuclear power plants (20 out of a total of 55 reactors are at present shut down). The company therefore had to resort to coal-burning and gas turbine plants (with a total capacity of 1,500 megawatts) at the end of July, "which is quite unusual," Jean-Marie Gres, the head of the Water Management Service of the Alps Region, indicated.

Actually, it is very difficult for this national company, which hopes to conserve its water resources and not to have to drain its dams to meet the peak consumer demand of the return [to work following summer vacation], to deal with the current drought (the amount of rainfall has been 30 percent lower than in 1988). Thus in July the Alps region produced 0.8 billion kilowatt-hour of water power as against 1 billion in July 1988, or a drop of 20 percent.

To compensate for this production shortage, the EDF is placing a higher demand on its nuclear power plants, which also require water to operate at full capacity. This problem involves 9 of the 15 reactors along the Rhône, since the remaining six are air-cooled—by big concrete towers that look like big jars of yogurt—and do not have anything to do with the heating of the river. So, yesterday, the Superphenix plant, which is cooled in the Rhône, operated with a total capacity of 950 megawatts out of a potential capacity of 1,200 megawatts. In fact, by order of the prefecture, the Superphenix does not have the right to heat the Rhône during the months of July and August by more than a degree and a half in order not to endanger the fauna. Moreover, river temperature must not exceed 23° 1 km downstream of the plant.

TURKEY

'Secret Talks' With Argentina on Nuclear Plant

NC1809095789 Istanbul HURRIYET in Turkish
14 Sep 89 p 10

[Aziz Utkan report: "Secret Nuclear Talks in Ankara"]

[Excerpts] Turkey is holding secret talks with a high-ranking delegation from Argentina on constructing the first nuclear power plant near Ankara. The delegation arrived in Turkey on Monday. The talks at the technical level are expected to reach the decisionmaking stage soon. The participation of the Sezai Turkes-Fevzi Akkays Company in the construction of the power plant is becoming a strong possibility.

Meanwhile, it has been established that the bargaining talks between Turkey and Argentina have made the United States uneasy, launching an initiative to gather information on the project. It has been reported that U.S. Embassy First Under Secretary William Rope has

made various calls trying to determine how Turkish-Argentine nuclear cooperation will affect the countries in the region, particularly Pakistan.

Replying to HURRIYET's questions, Professor Atilla Ozmen, director of the Turkish Atomic Energy Institution, said that work is continuing with Argentina for the construction of a 25-megawatt nuclear reactor and that

an effort is being made to find a suitable location near Ankara for the power plant. [passage omitted]

Ozmen said that the construction cost of the small nuclear reactor will be about \$42 million. He also asserted that nuclear fuel for the reactor will cost \$8 million, and personnel and operation will cost nearly \$5 million. He added that Turkey will be able to take its first step in the nuclear field for \$55 million. [passage omitted]

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